FRAME

THE NEXT SPACE
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SUMMER 2023

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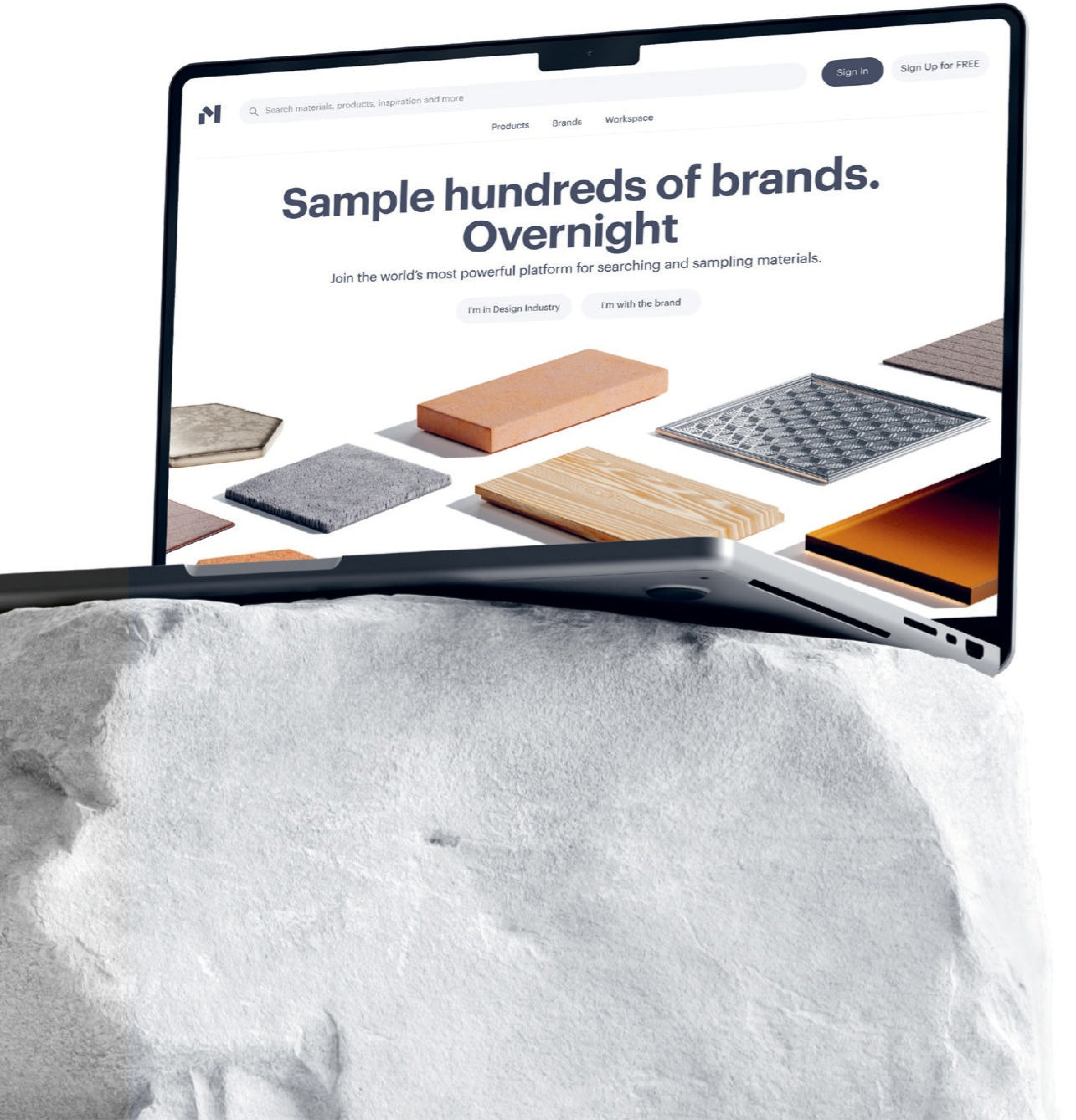
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www.gandiablasco.com
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Ohtake

Basins in fluid shapes and with lines we find in nature.
Ocean's waves, organic and sensual movements:
the essence of the Ohtake Collection by Ruy Ohtake.

Roca

roca.com/ohtake

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SPOT THE DIFFERENCE

Does this issue look different than all of our previous editions? Some years ago, an avid reader told me that FRAME showcased a very distinctive style. I'd never given any thought to style before, but was told that the designs we published were expressive, bold and colourful. In short: projects that wow.

And they were right. In our search for innovation and creativity in spatial design, we've always been attracted to rather radical approaches that involve a lot of CMF: colour, material and form (the F actually stands for finish, but form is more appropriate in this context). Let's call it maximalist design.

If you've been following us, you've surely noticed that we've taken a different direction in the last few years. Instead of being interested in 'what' and 'who', we started to ask 'why' and 'how'. We began focusing less on CMF and more on user experience and environmental impact. Our 25th-anniversary issue was the clearest manifestation of this new direction. We confidently put five drivers for the future of spatial design on the map: (user) experience, wellbeing, sustainability, co-creation and agility.

This issue is our most ambitious so far. It addresses the manifold ways architects and designers can – no, *should* – make their output more … sustainable. I'm quite hesitant to use this word. It's been overused, misunderstood and abused. Everybody talks about it, but only few grasp what it actually means in the context of spatial design. To be honest, I'm no exception. That's why we look at sustainability from a wide variety of angles, and try to give you as many takeaways as possible.

To begin with, we present three young studios with ambitions to build less but better, give waste materials infinite afterlives, and consult communities to secure projects that are long-lived. After all, it takes passionate, strong-headed people with a different mindset to drive positive change.

But as their studios grow, they may need to formalize the often-intuitive way they operate their businesses. One of the most comprehensive ways for organizations to demonstrate their values and beliefs to the world is getting B Corp certified. It means putting social and environmental impact on par with profit. We talked with several studios and a consultant to get a better understanding of what it takes – and means – to be a B Corp.

But the biggest part of this issue is dedicated to the nitty-gritty of decreasing the environmental impact of spaces and products. Are biomaterials ready to be commercialized? What are the merits and challenges of mass-timber buildings? Is it possible to operate a hospitality business on a zero-waste basis? The real question is whether society is ready to fully embrace an ethos of doing less but better. It would imply that designers work with what already exists and that we all learn to love a different kind of beauty – at least for the time being.

After all, this issue *does* look different than all of our previous editions.

Robert Thiemann
Editor in chief

maharam

UPGRADE
YOUR OFFICE
PANORAMA
by Ben van Berkel/UNStudio

Beyond traditional workspaces:
embrace the change and empower
the third space experience.

fantoni

www.fantoni.it

Furniture made with surplus stock, offcuts and RECYCLED materials. Modular appliances to break the discard-and-replace cycle. BIOCOMPOSITES based on renewable fibre crops. Seating 'knitted' from PLASTIC waste. A first of-its-kind WOODEN toilet. Plugging into PLANTS to power lighting objects. Separable systems for easy recycling. Colours extracted from local FLORA. We share the PRODUCTS defining the market today.

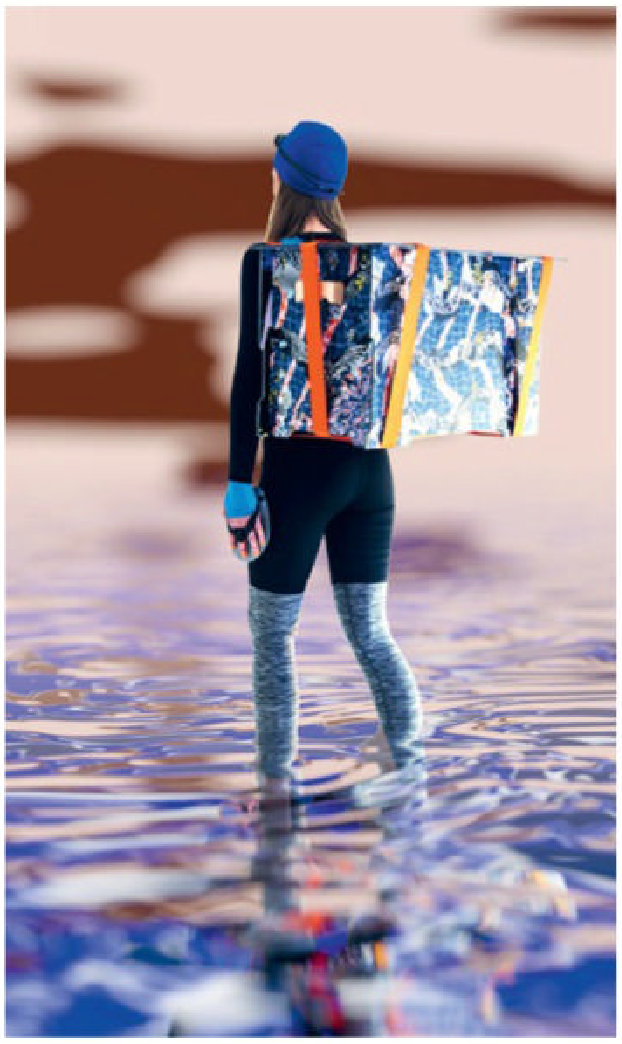
Courtesy of Anna Resei

Mathijs Labadie, courtesy of The New Raw

Courtesy of Loop Loop

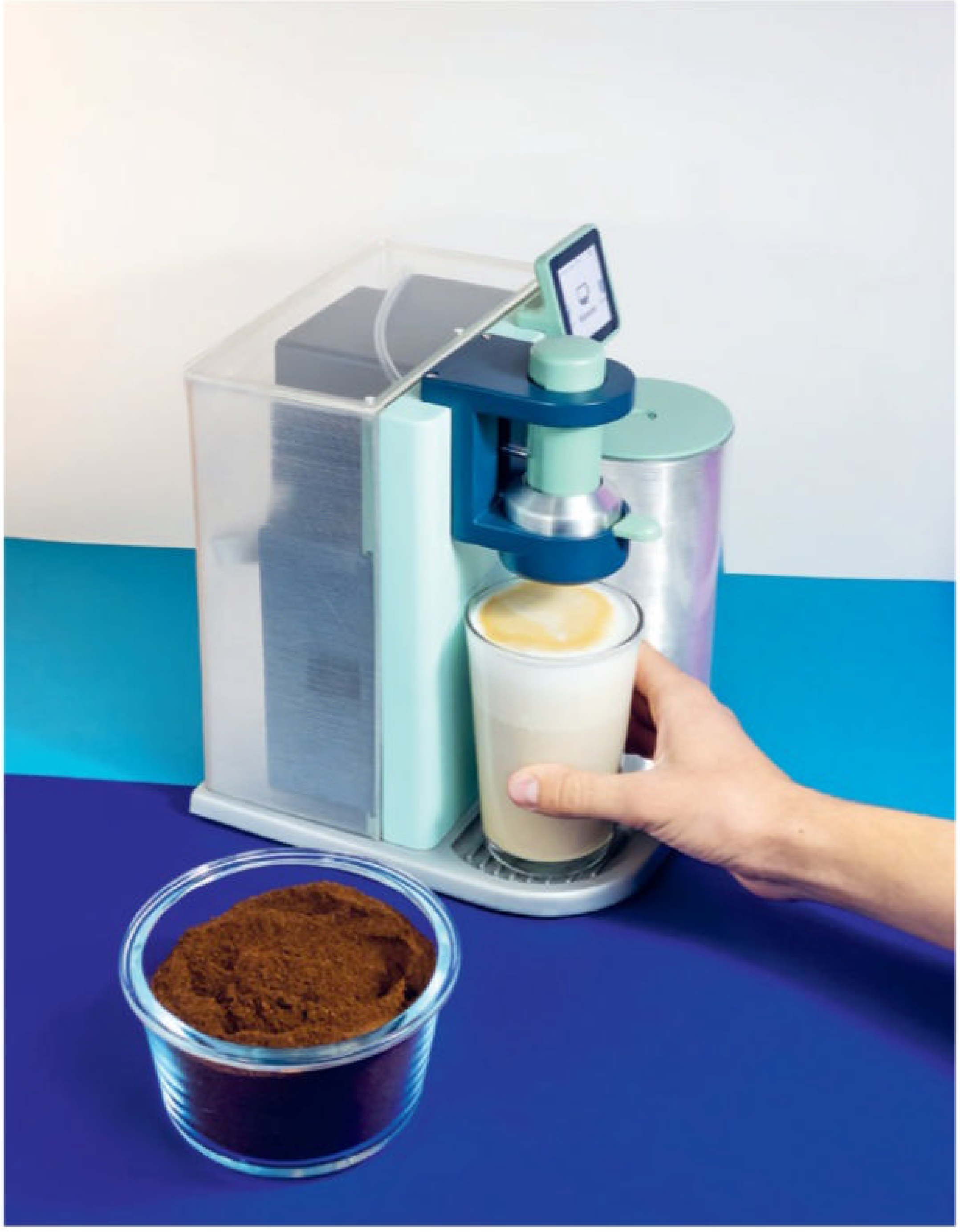
Courtesy of Woodio

The final project created during **ANNA RESEI**'s Fund for Young Design residency at the Museum für Kunst und Gewerbe Hamburg (MK&G), **WATER CARRIERS** furthers the designer's exploration into nomadic living in the age of the climate crisis. The surfaces of the storage chests – which double as 'backpacks' for belongings – feature digital renditions of patterns from pieces in MK&G's antiquities collection.
annaroro.com



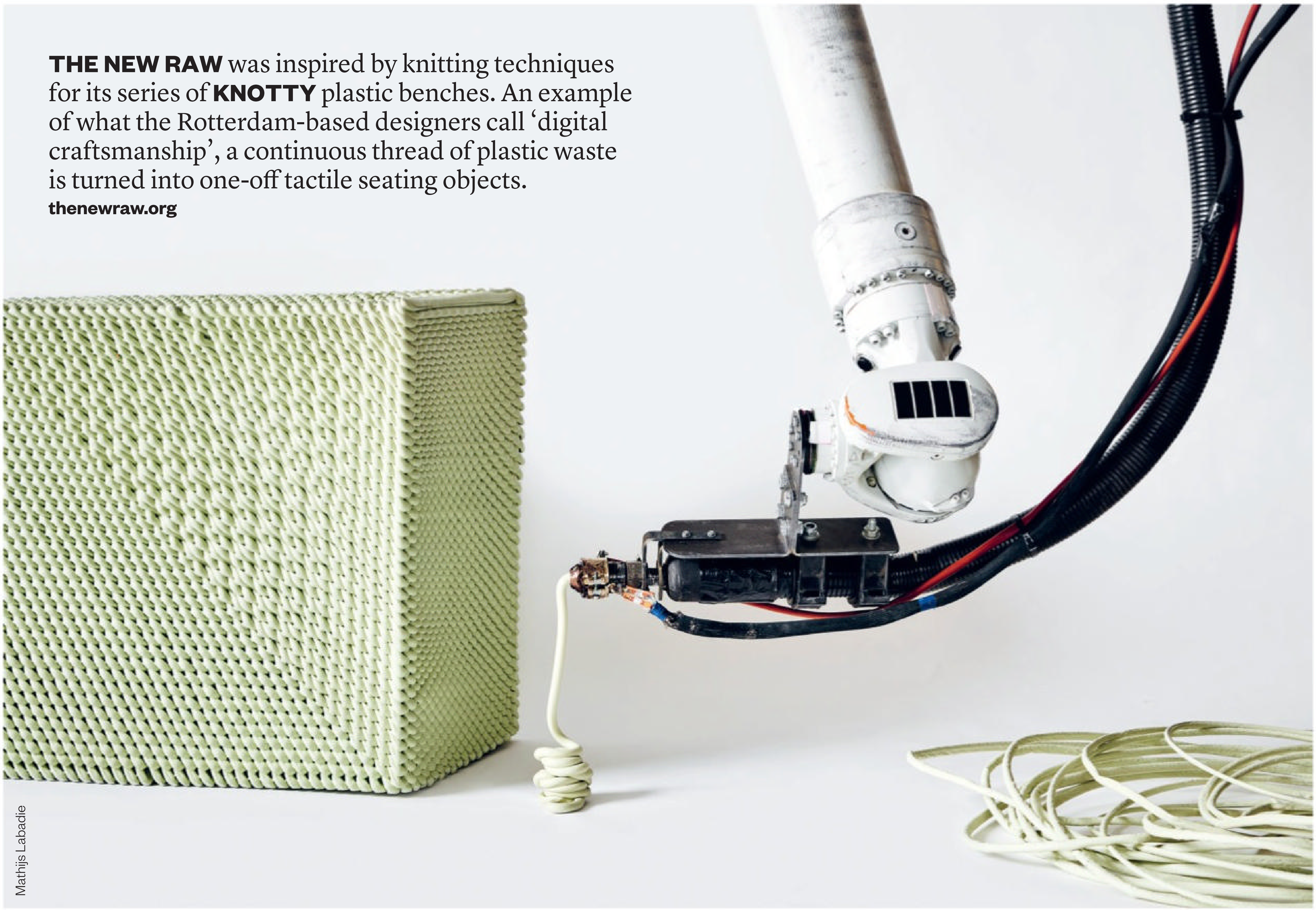
Michael Rygaard

Artist-designer **BIRGITTE DUE MADSEN**'s three-part project **TONALITY** explores colour, materiality and technique in lighting design using upcycled materials and offcuts. Gypsum block lamps are placed on podiums made of SolidNature's surplus production materials. The project was initially presented earlier this year at Copenhagen studio and concept store Tableau.
birgitteduemadsen.com



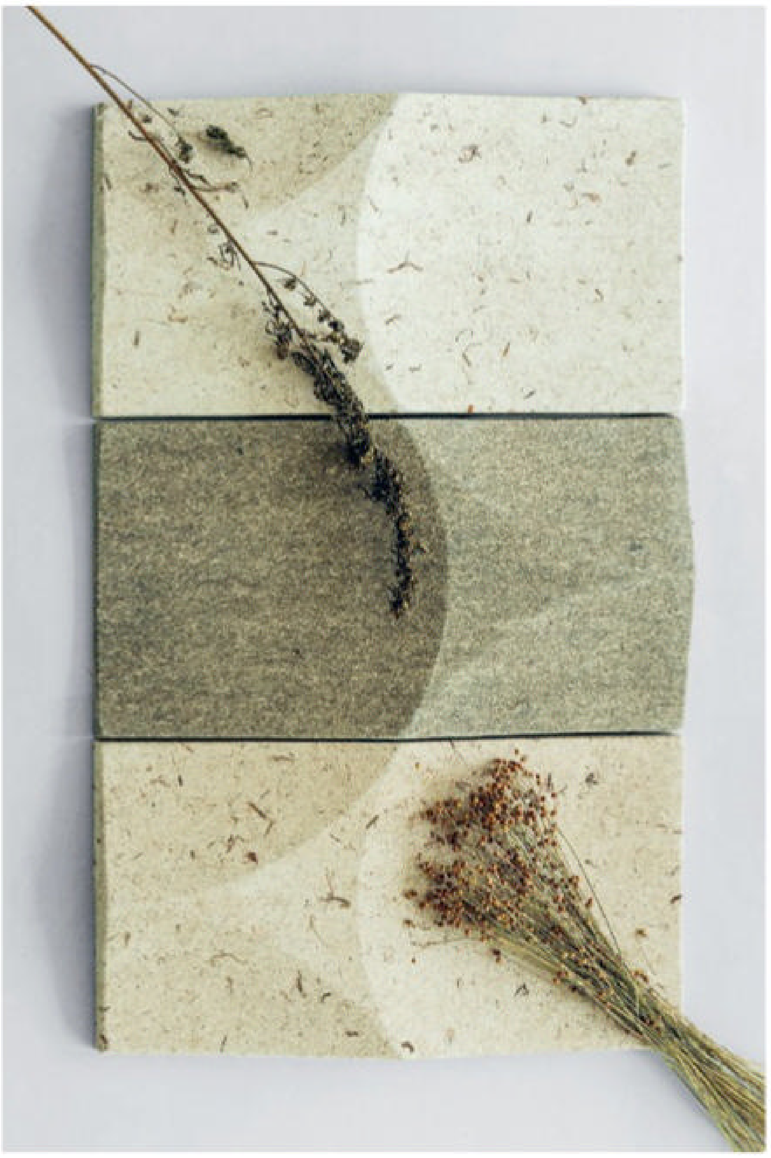
Frustrated with the discard-and-replace mentality associated with appliances, and the estimation that only one-fifth of electric goods are recycled, **THOMAS MAIR** developed **KARA**. The coffee machine is designed for easy assembly (with magnets), maintenance and reparability (without specialized tools), and each element can be 3D printed for those without access to replacement parts. Rather than hide the machine's internal workings, Mair put them proudly on display to communicate its reparability.
thomasmair.works

THE NEW RAW was inspired by knitting techniques for its series of **KNOTTY** plastic benches. An example of what the Rotterdam-based designers call ‘digital craftsmanship’, a continuous thread of plastic waste is turned into one-off tactile seating objects.
thenewraw.org

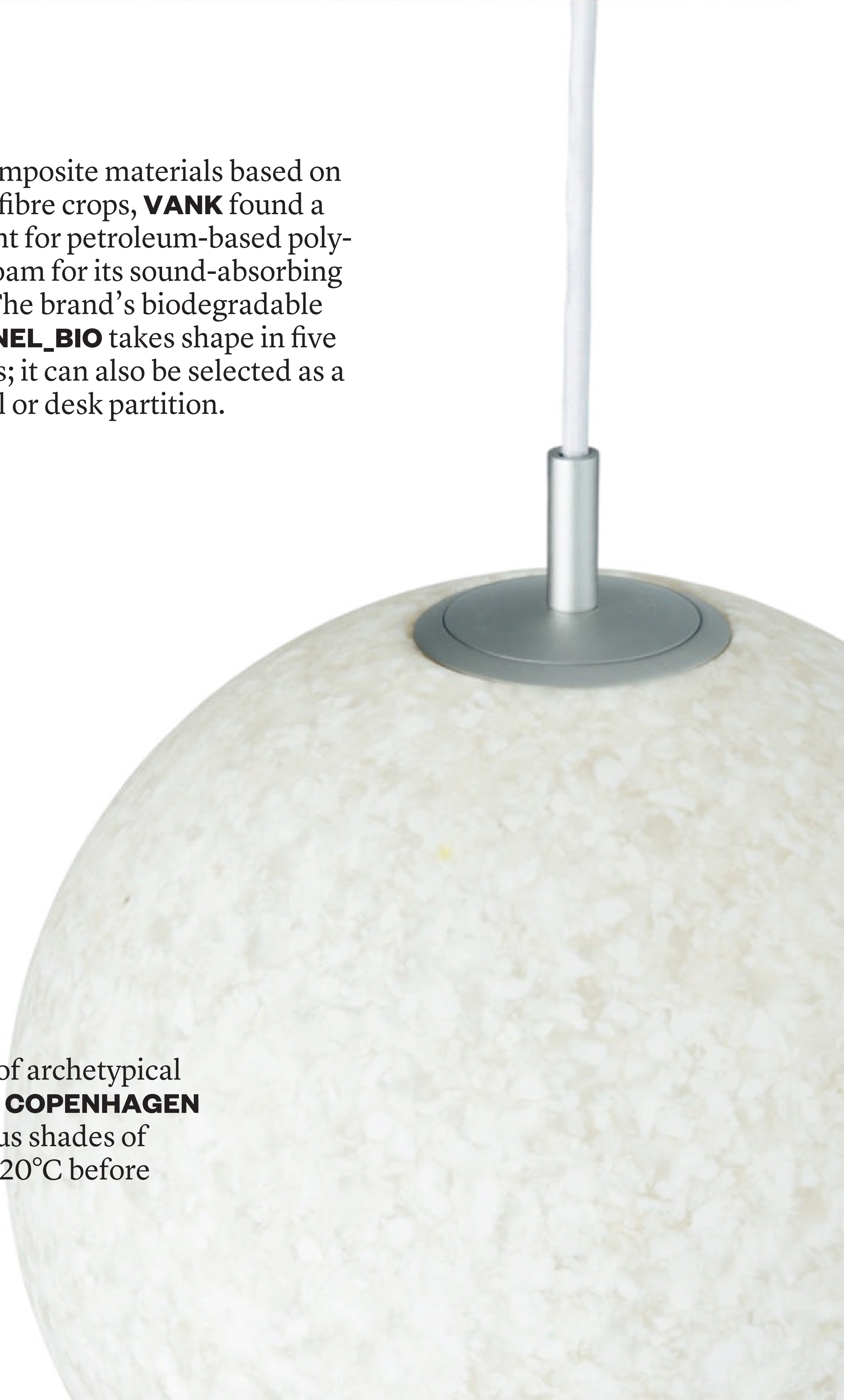

Mathijs Labadie

Rotterdam research-driven design studio **LOOP LOOP** has extracted colours from local flora like red cabbage, rhubarb and berries to create plant-based pigments. A world first, **LOCAL COLOURS** succeeds in making four pigments suited to aluminium anodizing, resulting in a collection of lighting objects. Because the source colours will likely shift from harvest to harvest, each seasonal series will be unique.
studioloop loop.nl

With its stone effect, **BOOST MINERAL** – a collection of porcelain tiles for floors and walls from **ATLAS CONCORDE** – is designed to bridge the natural environment and interior spaces. The company highlights porcelain as a sustainable choice: the material originates from natural raw materials, is shaped through technological processes with minimal environmental impact, and is entirely recyclable in line with the circular economy.
atlasconcorde.com



With biocomposite materials based on renewable fibre crops, **VANK** found a replacement for petroleum-based polyurethane foam for its sound-absorbing products. The brand's biodegradable **VANK_PANEL_BIO** takes shape in five 3D patterns; it can also be selected as a mobile wall or desk partition.
vank.design



PIX relies on recycled plastic to update the look and feel of archetypical spherical pendant lamps. The full-moon-like **NORMANN COPENHAGEN** luminaires come in four sizes and are composed of various shades of white plastic, which is mixed, granulated and heated to 120°C before being moulded into the final shape.
normann-copenhagen.com

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DESIGNED TO CIRCULATE.

For over 50 years, millions of LS 990 light switches and sockets have been in use around the world. Reasons for this include not only LS 990's timeless design, but also the durable quality of the products and the materials used. In the „Material Reutilization" category, JUNG has even achieved the „Gold" score in the Cradle to Cradle certification.

JUNG.DE/C2C

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cradle to cradle
BRONZE

Tubs, a family of luminaires for **LEDSC4** by **NAHTRANG STUDIO**, now offers endless options for customization thanks to the brand's development of a virtual configurator. Users can choose from different structures, sizes and materials to tailor shapes and styles to specific projects.
ledsc4.com

Sergio Chimenti

MOTTAINAI – a name derived from an ancient Japanese term that expresses regret in having squandered something – is a collection of rugs, seating, a pouf and more upholstered in fabrics upcycled from **PAOLA LENTI**'s production waste. The range shows a spectrum of possibilities for employing offcuts and leftover materials using different techniques.
paolalenti.it

BOLON has modified its **BOLON STUDIO** concept, adding new shapes to offer endless possibilities for personalizing flooring. Seemingly simple shapes can come together to create bold patterns by mixing and matching textures and colours from the Bolon collections. Made in Sweden with renewable energy and containing recycled material, the offering features 13 sizes of made-to-order tiles.
bolon.com

themagenzia.it Ph. Nava-Rapacchietta

Ensō

catellanismith.com

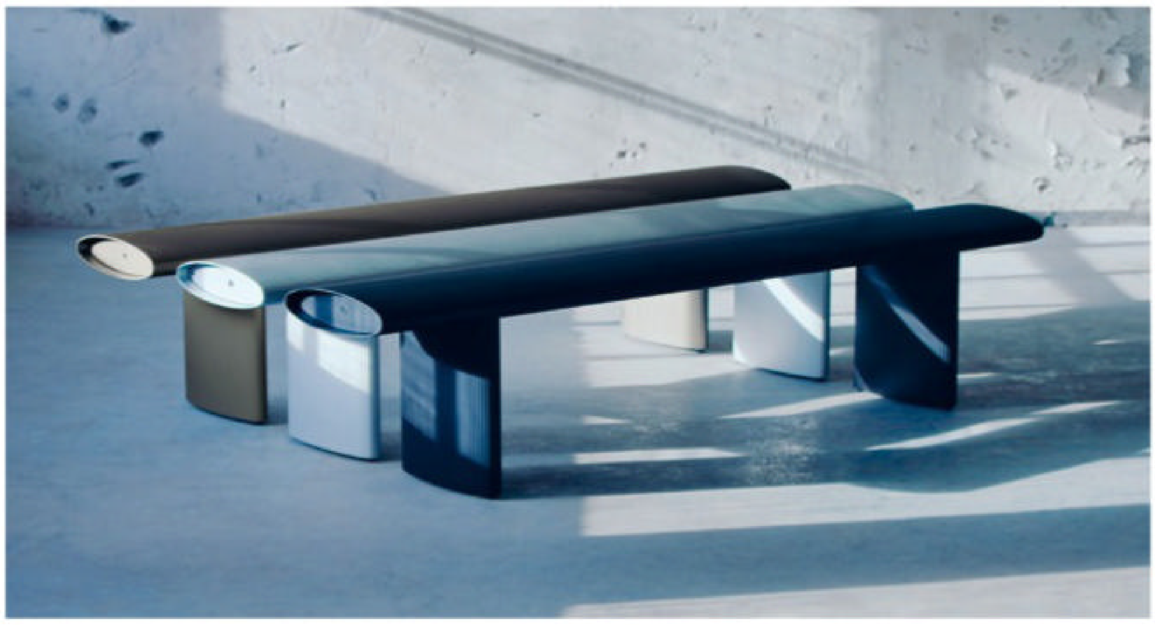
Catellani&Smith

PANORAMA responds to the need for flexible office interiors in the hybrid-working era. A collaboration between **FANTONI** and **UNSx** (UNStudio's experiential design team), the modular toolset can be shaped into numerous arrangements to facilitate on-site activities and hybrid teamwork. The system features different colours, textures and patterns, and is constructed from chipboard made of 100 per cent recycled wood.

fantoni.it

Indoor-outdoor bench **BELLO!** has an unlikely source of inspiration: pasta. Lars Beller Fjetland's design for **HYDRO** finds common ground between pasta making and the process of aluminium extrusion. Conceived with public transport hubs in mind, the customizable bench is made of almost 90 per cent recycled and 100 per cent recyclable aluminium.

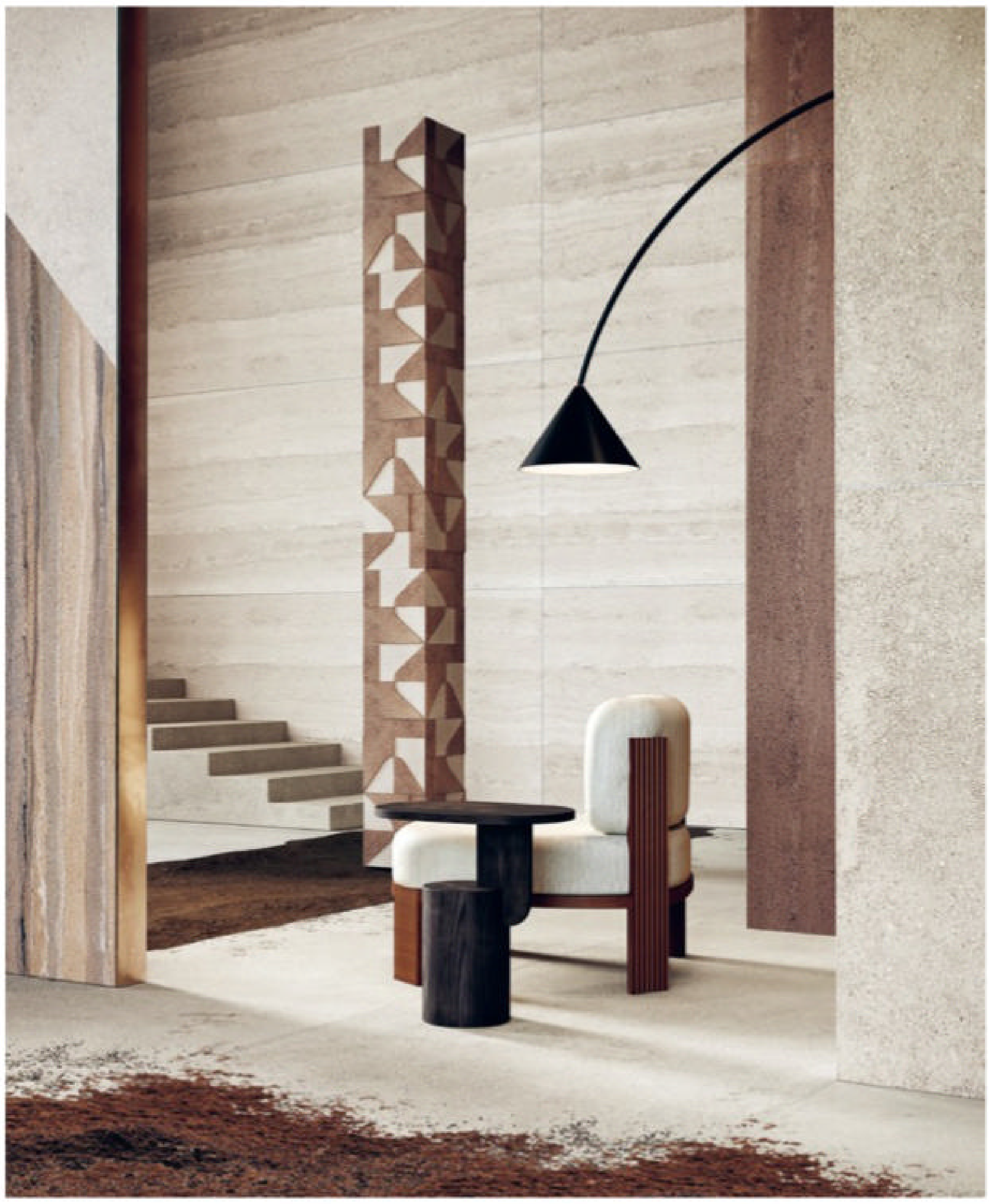
hydro.com

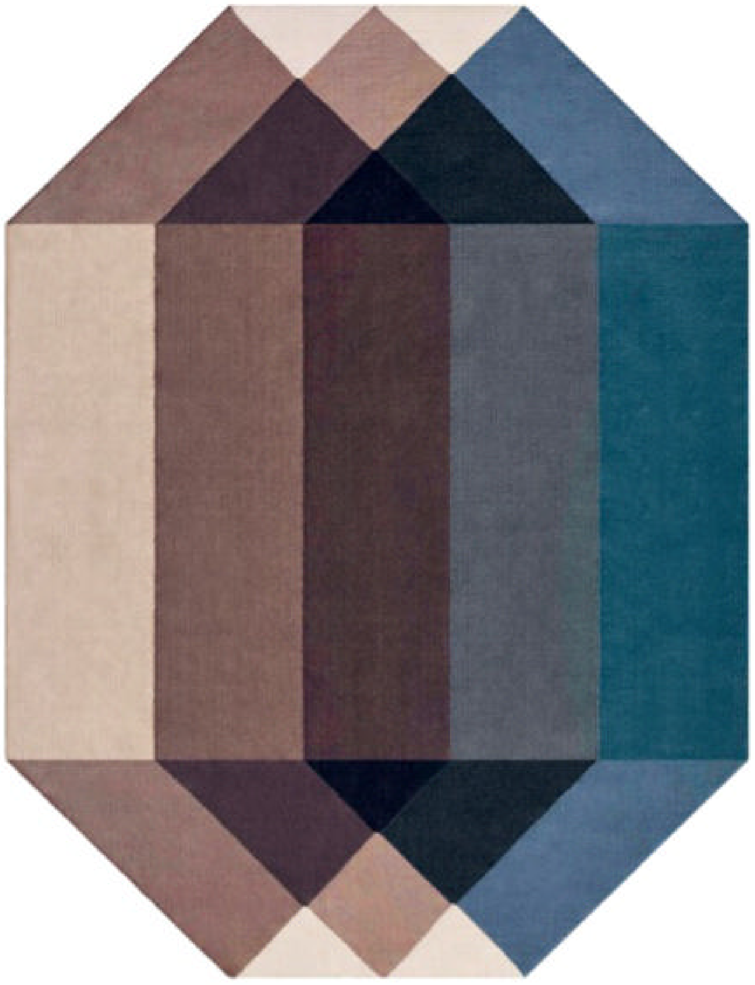


Sjur Pollen

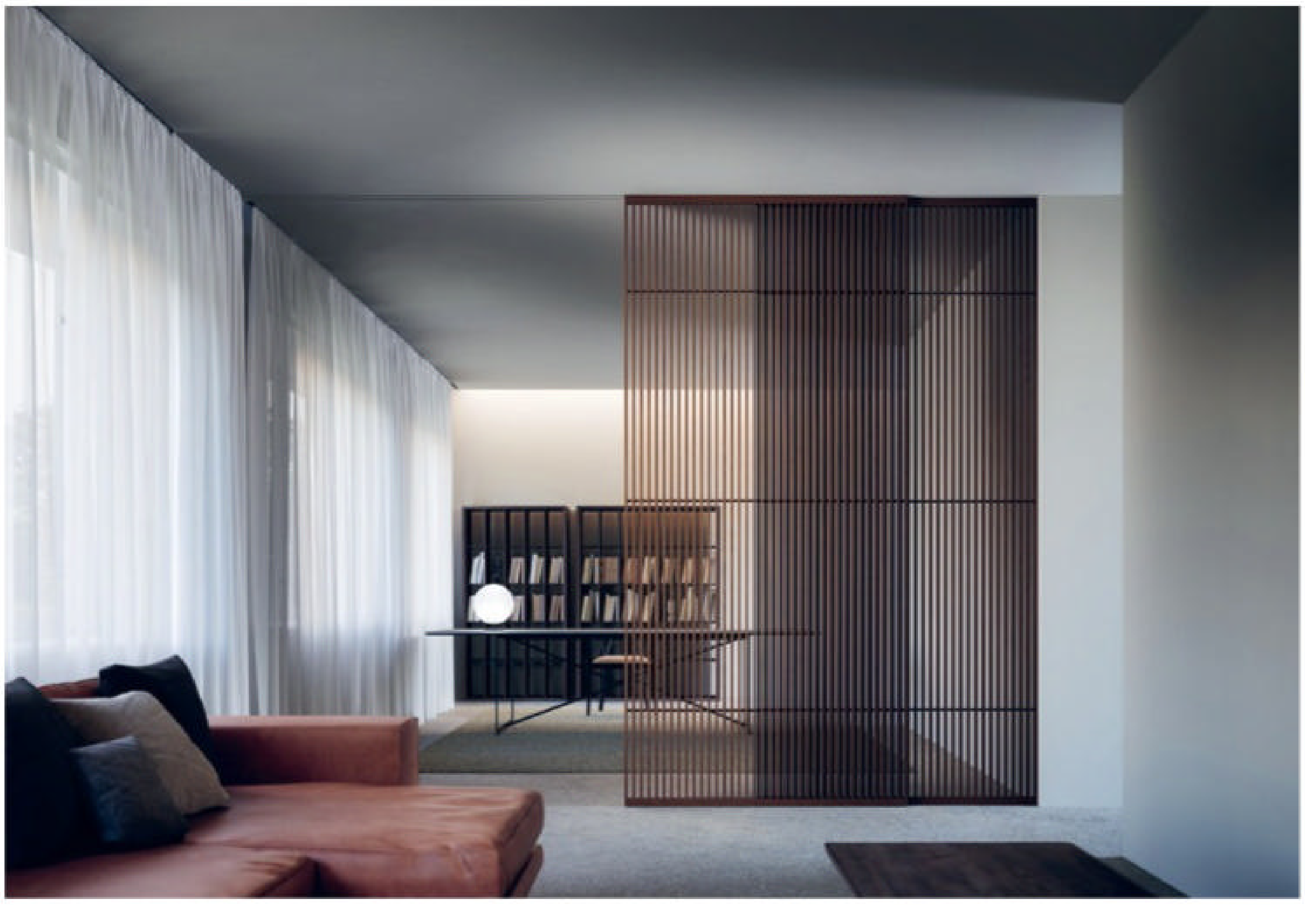
20

In the **COMPATTA** ceramic surface collection for **CEDIT** (a Florim brand), designer Federico Peri evokes the materiality of raw soil. The concept was inspired by stratification and the time-honoured rammed-earth building method. Made possible thanks to state-of-the-art ceramic production techniques, Compatta connects the ancient and the ultra-contemporary.
florim.com



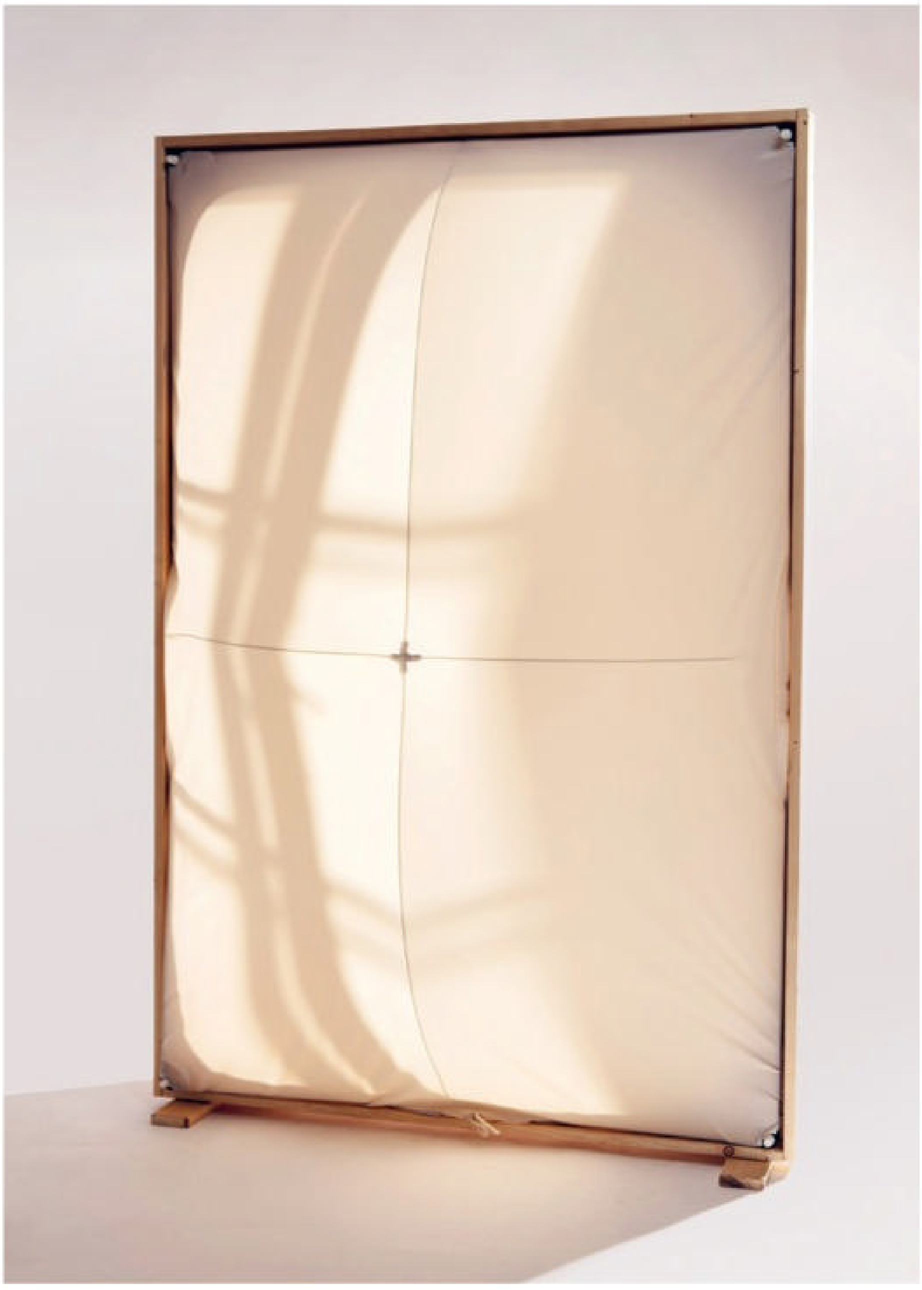


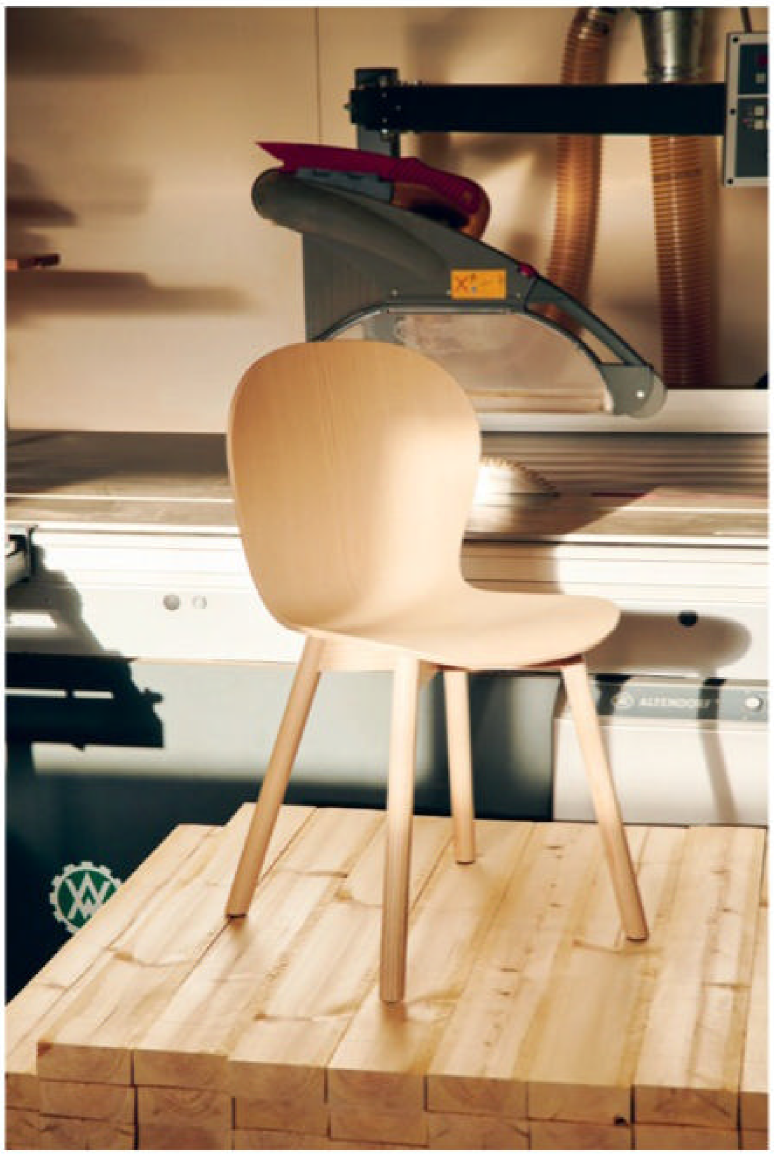
A collection of rugs made entirely from 100 per cent recycled PET for **GAN**, Charlotte Lancelot's **DIAMOND** plays with the many facets of its namesake. The (re)use of plastic fibres not only contributes to the company's sustainability efforts but makes the low-maintenance rugs suitable for indoor and outdoor use.
gandiablasco.com



Creating connection *and* division in interior spaces, **FOREST** – a Massimo Luca design – is a screen partition from **ADL**. Made of extruded aluminium, the glass-free panels – available in sliding-door or fixed options – visually filter different areas without blocking light or sound.
adldesign.it

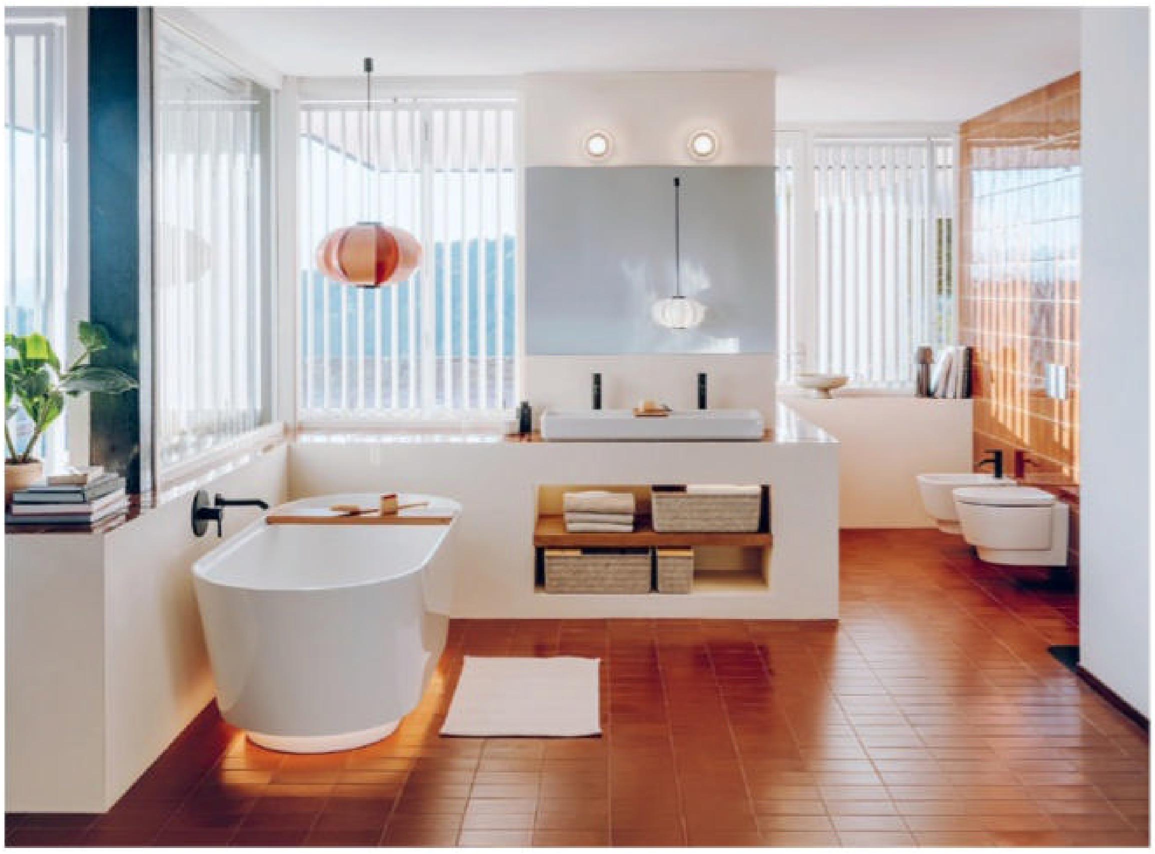
How can we address the climate and energy crises in existing building stock? That question drove **GERGELY VASS** and **NANNA WENSAAS** to develop an additional inner insulation layer for windows in older buildings. **MODIST** empowers tenants to improve their windows with a simple fabric cover that can easily adjust to different locations.
nannawensaas.com
gergelyvass.work



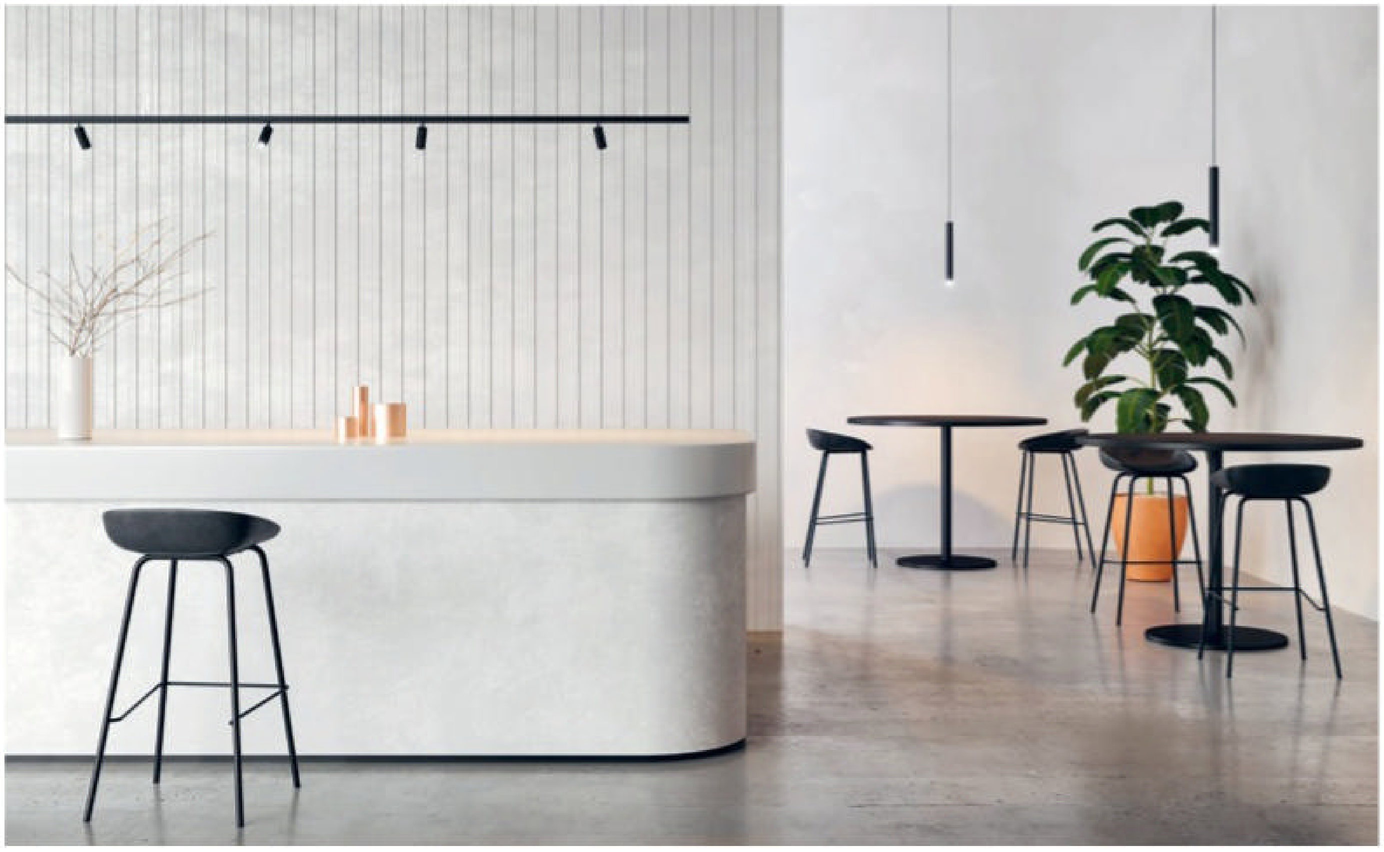


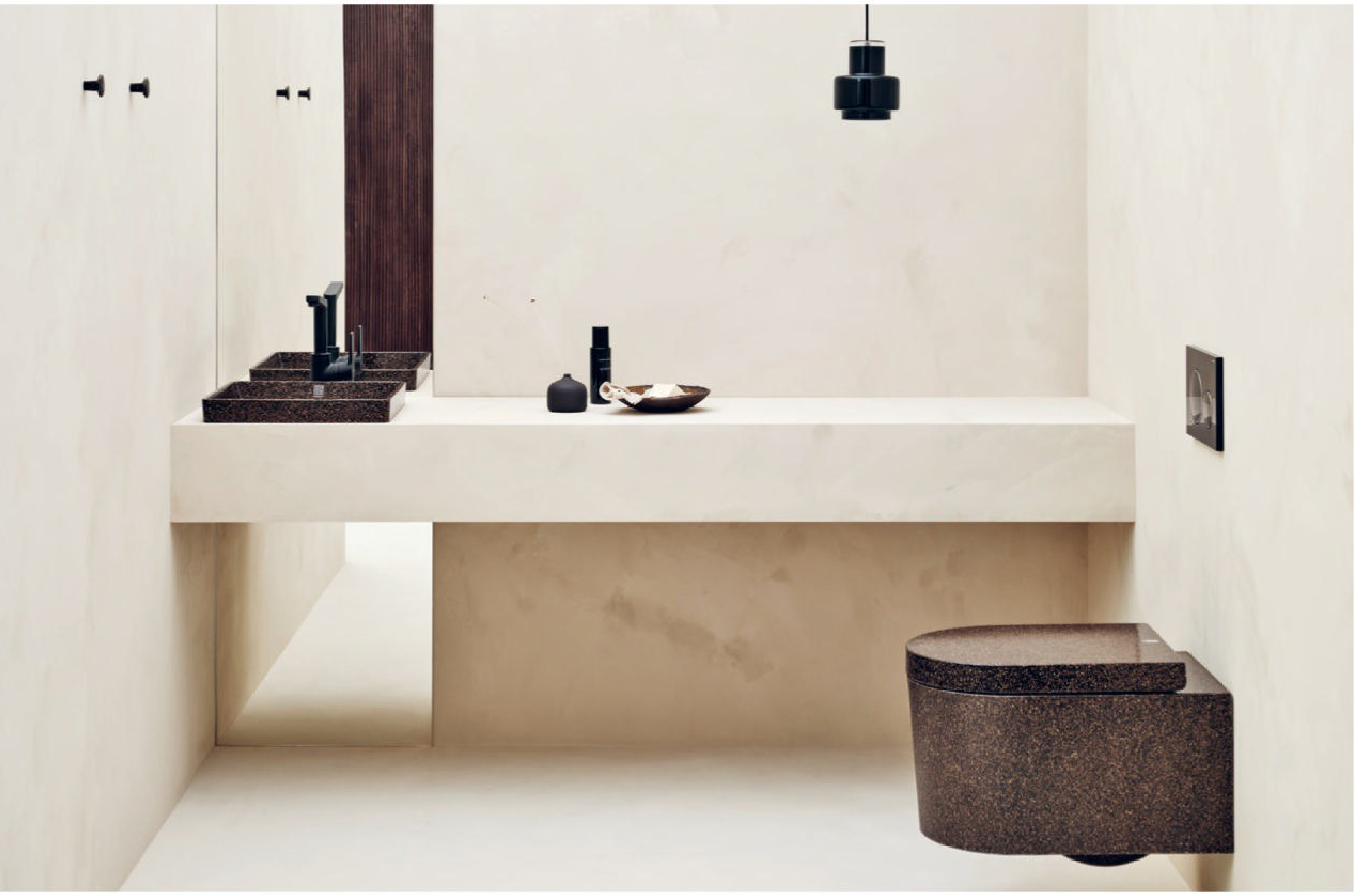
Circularity, affordability and quality are the three tenets of **ARC**, a chair by White Arkitekter for **MITAB.** Featuring a compression-moulded, timber-veneered shell, Arc can be easily reupholstered and disassembled, meaning parts can be either replaced when necessary or separated and recycled at the end of the chair's life.
mitab.se

ROCA's **TURA** collection, made in collaboration with Andreu Carulla, combines the play of light and shadow characteristic of the Mediterranean Sea with the simplicity and functionality of 20th-century architecture in the company's home of Barcelona. The range includes elements made of responsible wood and recycled materials, while the toilet's flushing system incorporates water-saving technology.
roca.com



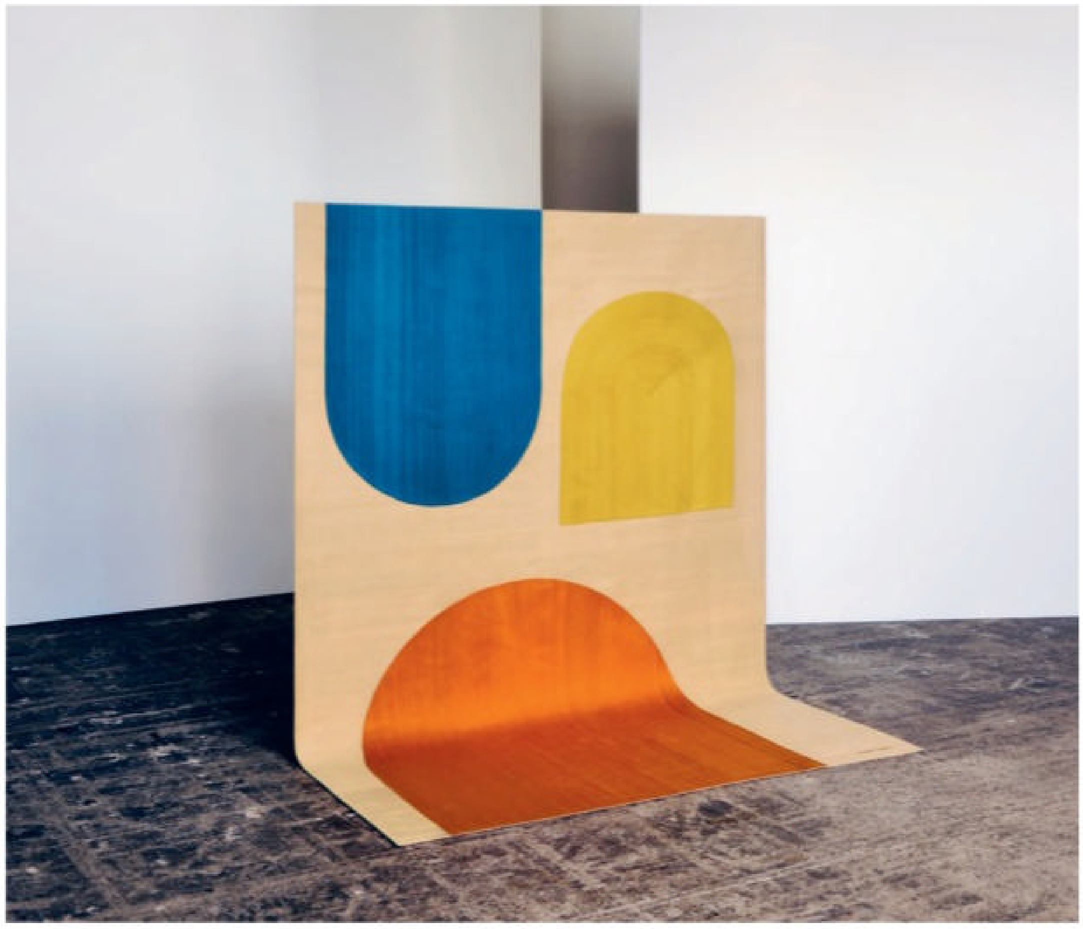
With tracks measuring just 11 mm wide and 10 mm high – and in recessed, surface and pendant configurations – **REGGIANI**'s **24V OUTLINE** lighting system fits discreetly into all kinds of interiors. Thanks to the inclusion of a curved option, users can create various (organic) formations and adapt their designs to specific architectural details, adding projector, pendant and linear lighting fixtures to complete the scheme.
reggiani.net



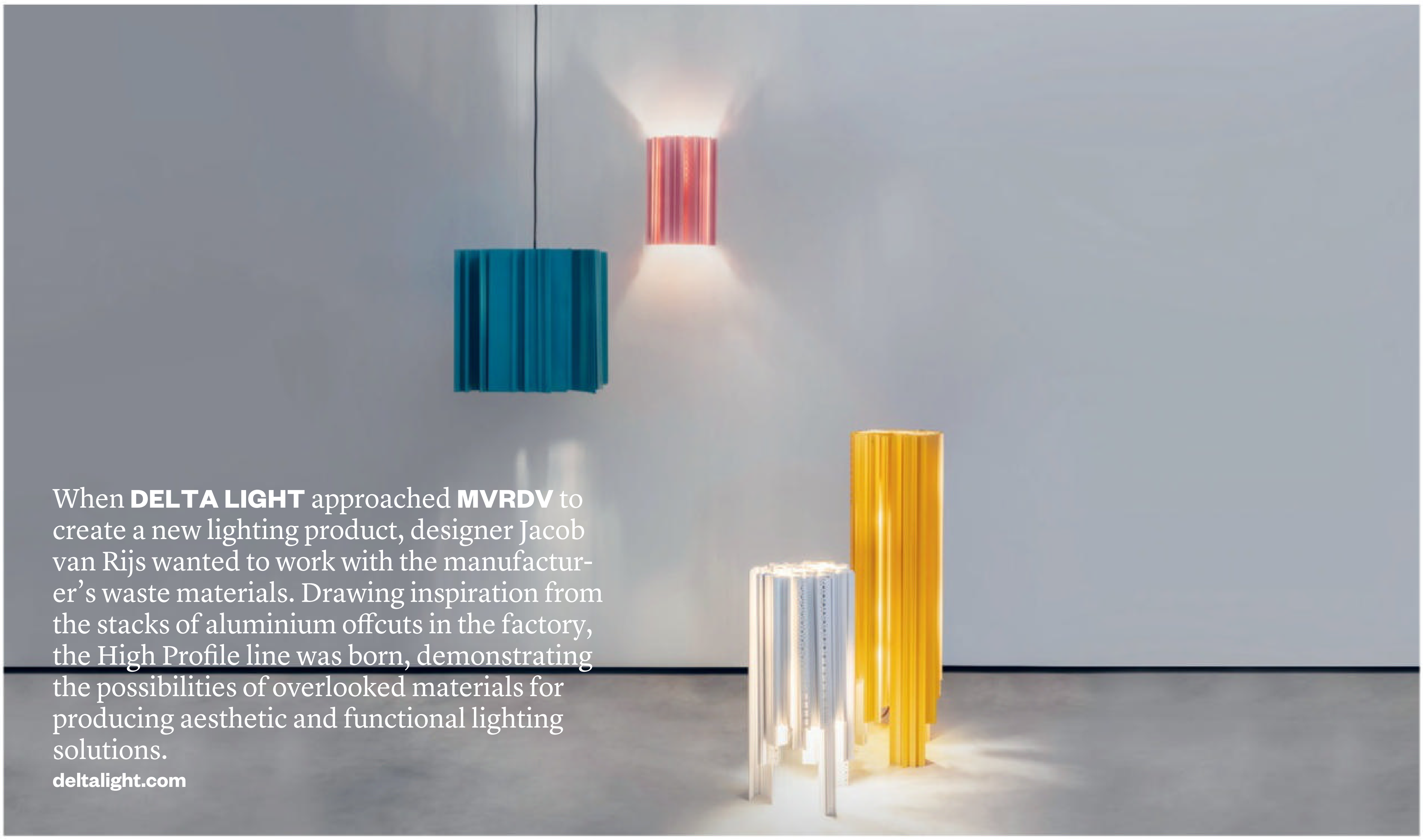


WOODIO BLOCK is a first-of-its-kind wooden toilet. Developed by Finnish biomaterial company **WOODIO**, it challenges material convention in the bathroom, using locally sourced wood and resin-based adhesives to realize a product with a 99 per cent reduced CO_2 footprint. This pioneering design is sustainable, durable, dirt-resistant and warm to the touch, prioritizing the user experience.
woodio.fi

An addition to **NARDI**'s Doga collection, Raffaello Galiotto's **DOGA STOOL** is made of fibreglass-reinforced polypropylene and fit for the outdoors. The stackable, ergonomic stool reiterates the collection's horizontal slats. Fully recyclable, it's produced sustainably in Italy – as of 2023, all Nardi's factories use electricity that is exclusively from certified renewable sources.
nardioutdoor.com



Using a rare, meticulous hand-embroidery technique, **HERMÈS** brings couture to the floor with the **CORDÉLIE ARÇON RUG**. Compositions by designer and artist Pierre Charpin are traced in fine cotton cord on a strong linen backing, as if drawn with a pencil.
hermes.com



When **DELTA LIGHT** approached **MVRDV** to create a new lighting product, designer Jacob van Rijs wanted to work with the manufacturer's waste materials. Drawing inspiration from the stacks of aluminium offcuts in the factory, the High Profile line was born, demonstrating the possibilities of overlooked materials for producing aesthetic and functional lighting solutions.
deltalight.com

Slice of colour

Designed for creating multi-layered spaces, nine new bold-coloured laser-cut designs push Chemetal's metal expertise to new levels.

Launched this spring, the Transparency collection continues Chemetal's evolution into thicker metal designs. It began in 2021 with the release of Surface Mode, industrial, black CNC-carved patterns. 'With Surface Mode, we pushed our metal expertise,' says Chemetal creative director and president Geoff Schaefer. 'We loved the idea of using thicker aluminium that, because it has no backing, can be more easily repurposed, reused or recycled.'

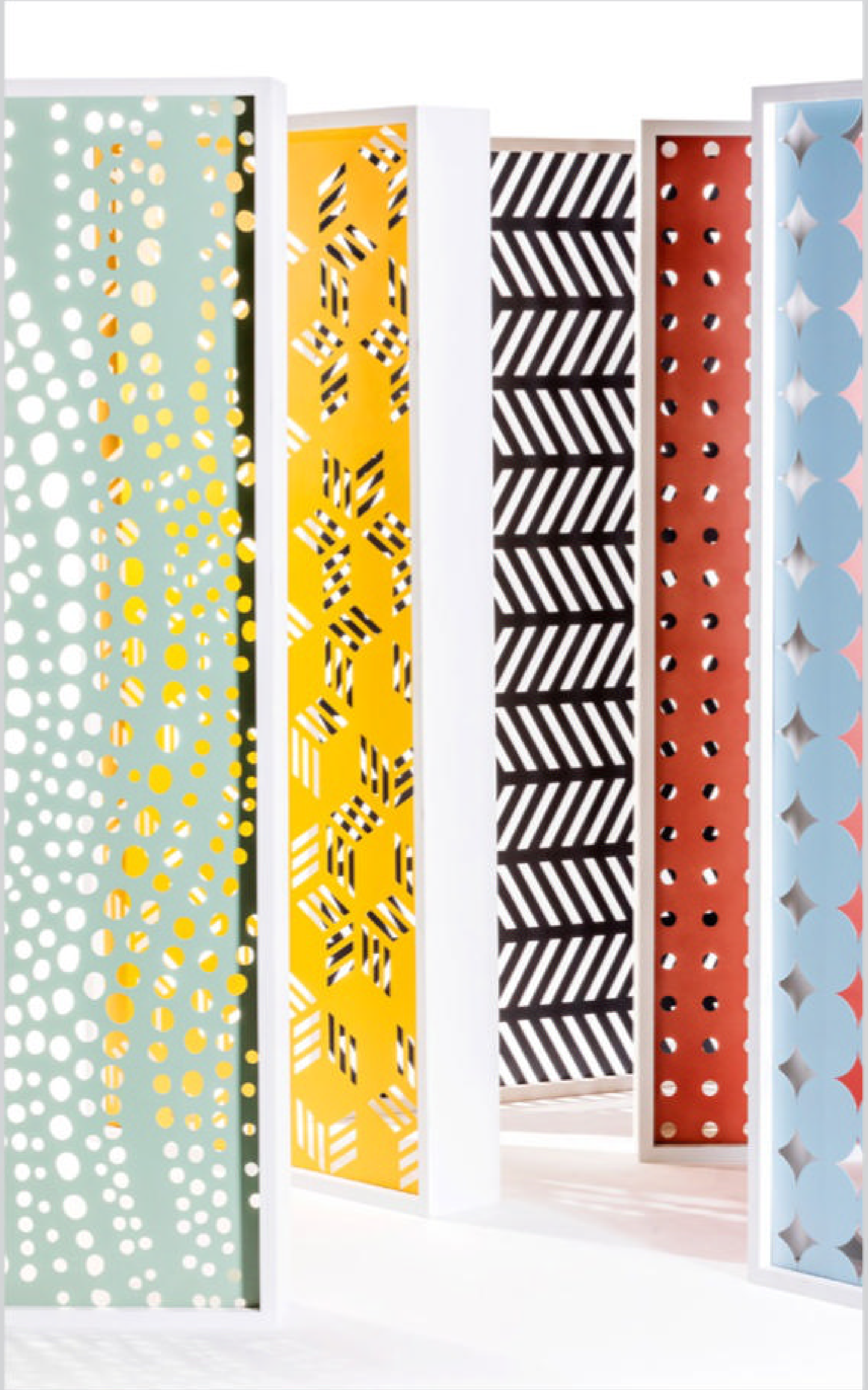
The recent addition of a large-bed fibre laser, which can cut designs and shapes out of aluminium panels, enabled Chemetal to go in new directions. The Transparency collection is the result. It features nine designs – from biomorphic to classic, mid-century and futuristic – and eight colour options, including nature-inspired tones like Seafoam and Saffron.

Designed by Chemetal's in-house team of creatives, CAD experts and fabricators, these off-the-shelf solutions offer a glimpse of what's possible through customization – designers can create their own shapes and sizes, or work with Chemetal's team to tailor metal designs to specific architectural projects. Since ease of use was a key concern during the product's development, an optional frame system can be used to create free-standing room dividers, to attach the panels to walls or atop half walls, or to suspend them in space.

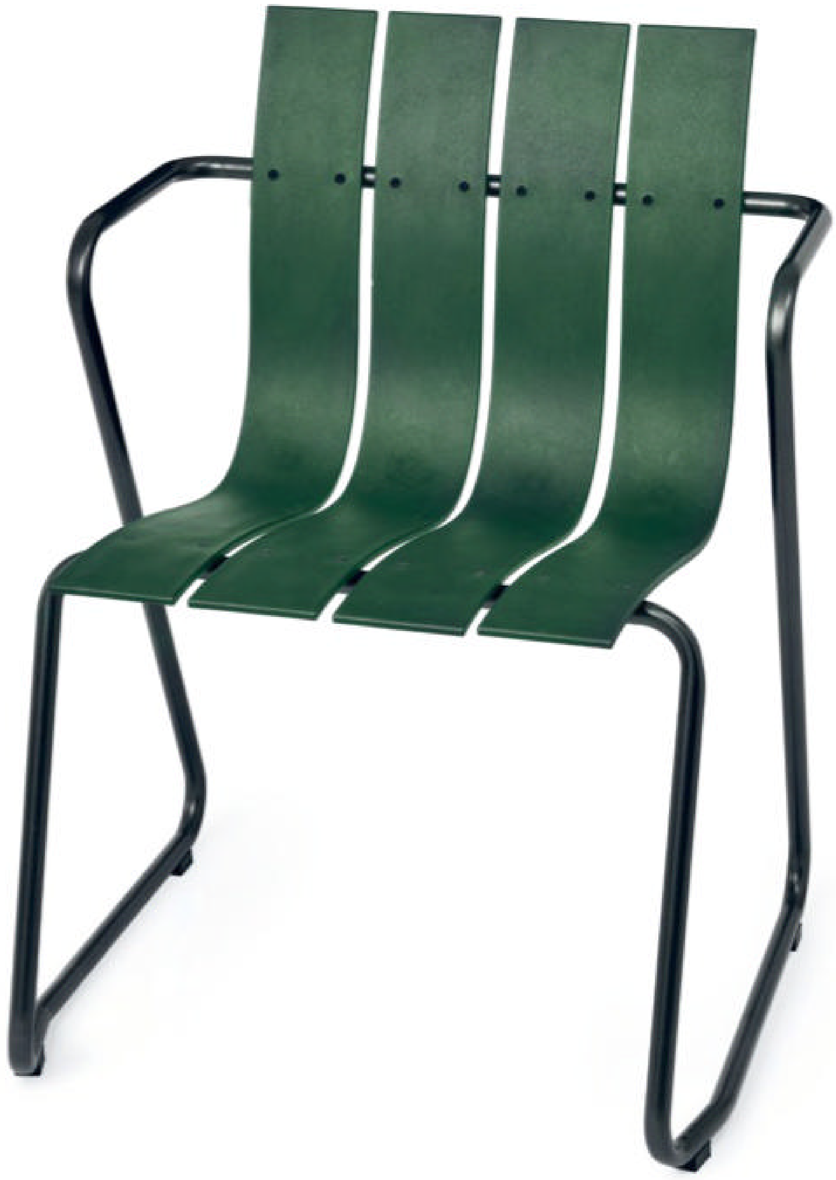
In addition to Transparency's repurpose, reuse, recycle philosophy, the panels are powder coated, a low VOC alternative to spray coating that can be more easily reclaimed and disposed of than solvent-based finishes. This aligns with Chemetal's wider sustainability philosophy. Being part of the mindful Materials (mM) library allows Chemetal to transparently share information about its products, which contribute to LEED certification in several areas. What's more, the company has fitted the roof of its 6,500-m^2 facility in Western Massachusetts (around two hours' drive from Boston) with solar panels that power a significant percentage of its energy needs.

A second-generation family-owned company that's been in business for over 50 years, Chemetal remains committed to its standard metal designs, a vast collection of anodized and HPL aluminiums, brass and oxidized copper that are sold worldwide. 'Metal is a luxurious material,' says Schaefer, 'and Chemetal makes it easy to bring this elegance and energy to commercial interiors.'

chemetal.com

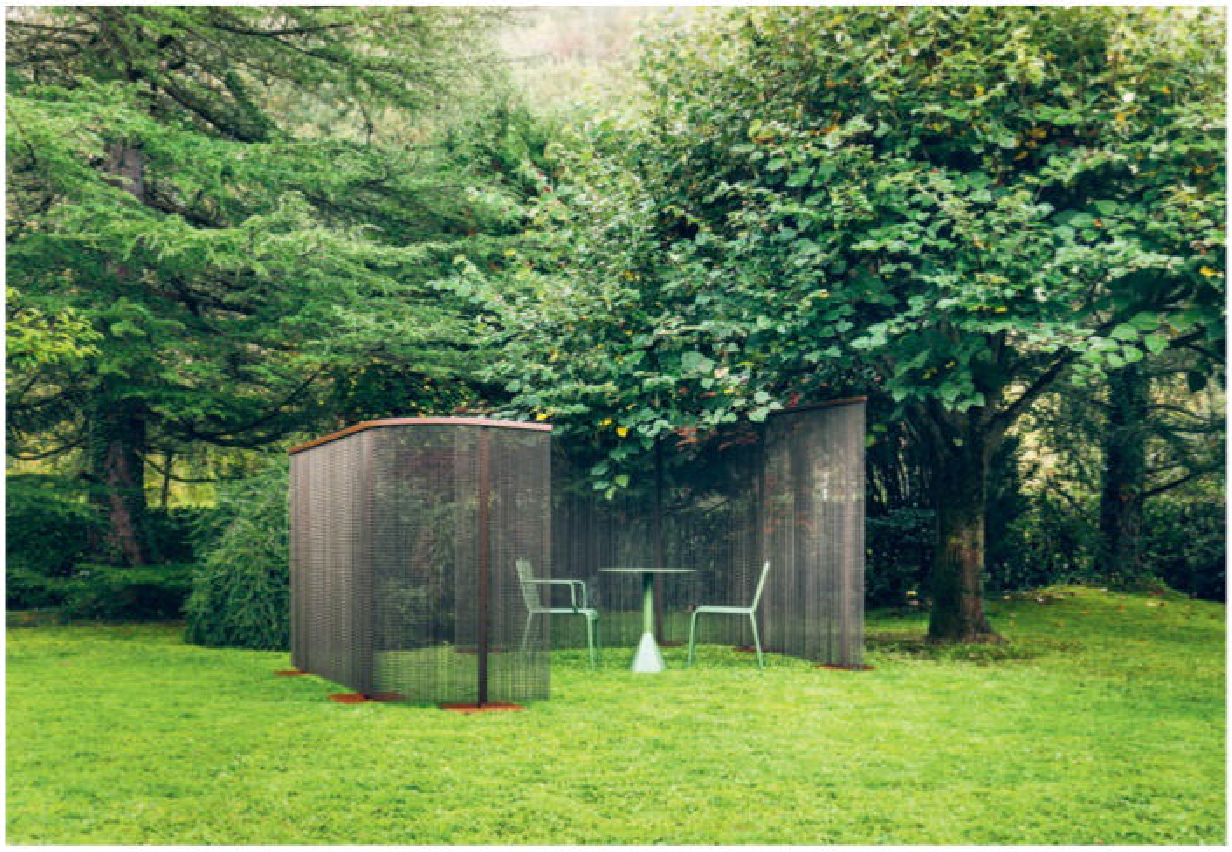


Plugging into plants as a source of electricity, **FENGFAN YANG** developed **LIGHT ON LIVES.** The luminaire's function is based on the output of microalgae – they don't generate much electricity, but enough for a low-luminance night light. The lamp requires no power source or recharging – just a regular water refreshment.
fengfanyang.com



Plastic beer kegs get a second life in **MATER**'s **OCEAN OC2 CHAIR**, a spin on Nanna and Jørgen Ditzel's 1955 original and an earlier upcycled iteration constructed from fishing nets and ocean waste plastic. Mater sourced the material for the new classic from Danish brewery group Carlsberg and A:gain (formerly Re-Plastic).
materdesign.com

Thanks to the development of an innovative self-supporting system, **KRISKADECOR** chains can be installed anywhere to create flex spaces, indoors and out. **FEEL FREE** – an estudi{H}ac-JMFerrero design – is customizable in height, shape and colour, and can include curtains or feature high-resolution imagery. The system can also be separated for recycling if necessary.
kriskadecor.com



Jordi Anguera

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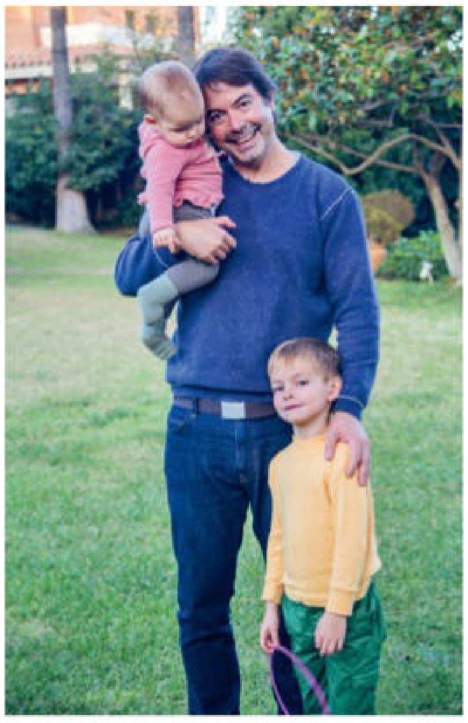
INTERIORS
FROM SPAIN

Elfur Hildisif Hermannsdóttir, courtesy of Flétta

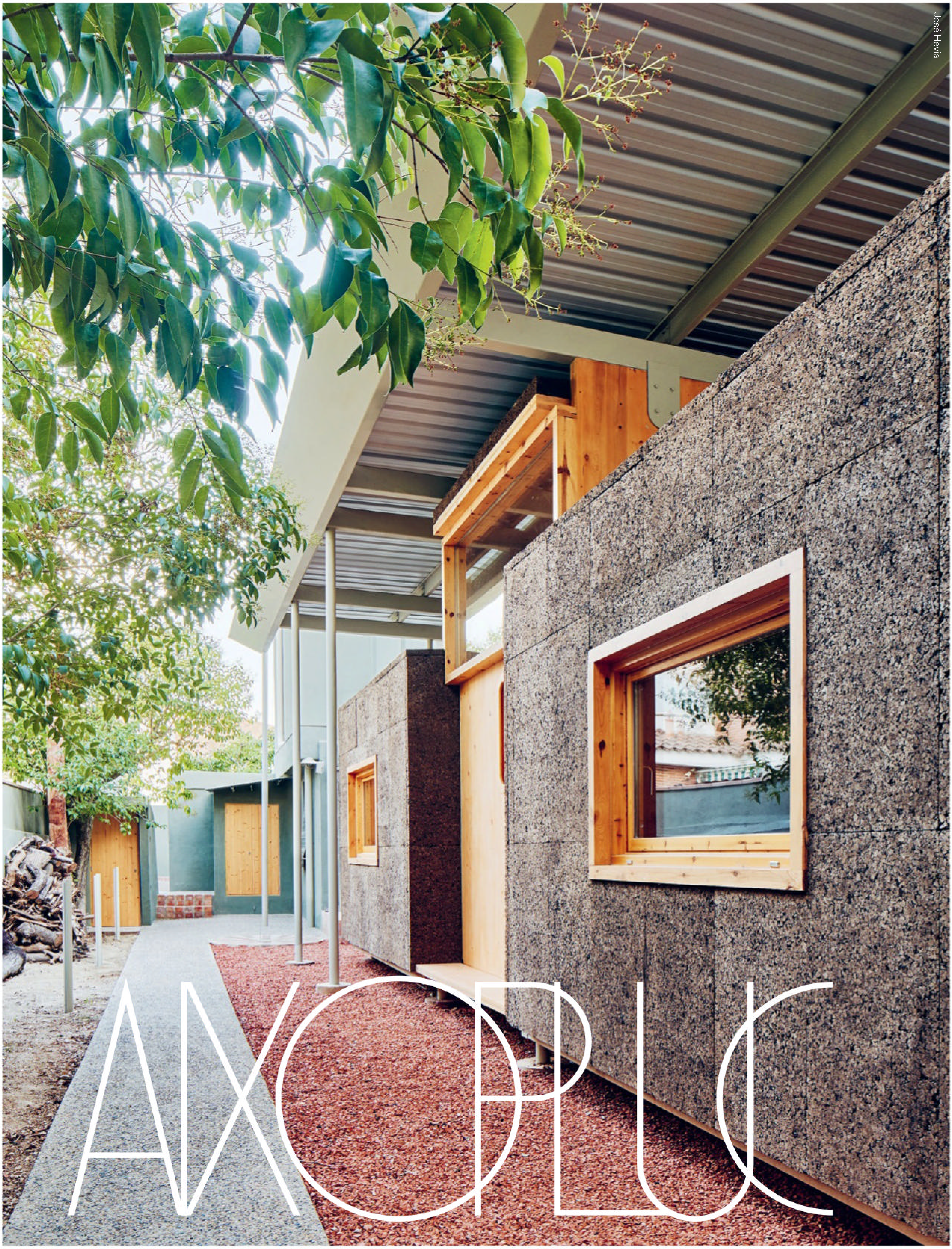
How can waste shift into a cycle of circularity, how can we build more hospitable habitats, and how can increased ownership among end users secure a project's longevity? We put three studios with enticing answers in the spotlight as this issue's Ones to Watch. FLÉTTA enables the post-reuse potential of materials, AIXOPLUC conceives empathetic spaces considerate of both people and the biosphere, and CAUKIN practices community engagement to effect real social change.

Courtesy of Caukin



Courtesy of Aixopluc

AIXOPLUC



José Hevia

Build less, then build better. Set on improving the health of our built habitats – and the ecosystems they are part of – Catalan architecture firm Aixopluc designs hospitable spaces that are ultra-conscious of their context.

‘Our task as architects is not to make the Earth inhabitable – it already is without the interference of architects in particular, and humans in general – but more hospitable,’ says David Tapias Monné, founder of Spanish architecture firm Aixopluc, which is Catalan for shelter. Though Monné doesn’t think human societies are hospitable by nature – ‘they tend to fear and dislike strangers and the “other”’ – he is confident in the role of the architect to make truly empathetic and hospitable spaces for people, while being considerate of the biosphere.

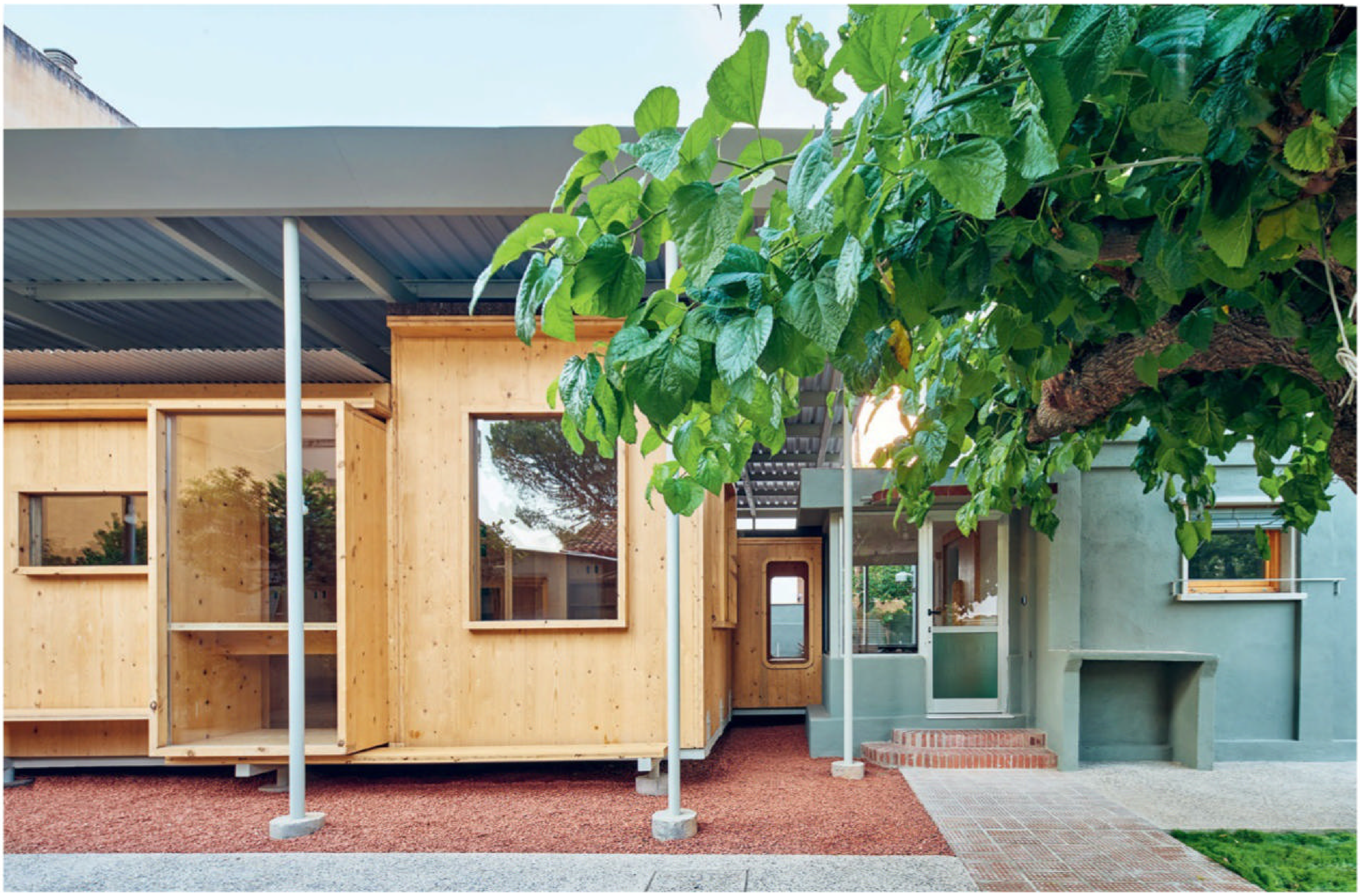
To get there, Monné thinks we urgently need to build a more symbiotic – instead of parasitic – relationship with nature, which is why Aixopluc works with what’s on hand, both in terms of materials and skills. In line with that, the studio makes the most of available natural elements such as the sun, wind and rain. Building in ways that suit the local climate is not new in itself. ‘All construction must adapt to specific climate conditions,’ says Monné. ‘The challenge today is that these conditions are quickly becoming more extreme, a little harder to predict and more demanding for buildings to respond to, with the added challenge of increasing resource scarcity.’ And, when you’re dealing with strong seasonal changes, a dwelling doesn’t need to do the same for its inhabitants in summer as in winter. In many ways, it needs to do the opposite. But most houses are static and changing them completely according to the seasonal cycles is an extremely material-, time- and energy-consuming strategy. That’s why Aixopluc questions how a house can change its behaviour and adapt to fluctuating external changes without having to undergo major internal modifications.

For the renovation of a traditional family farmhouse in Aixopluc’s home base Reus, for example, a conservative energy strategy was developed. Carefully considering the site’s microclimate, and the orientation and function of each space, hyperlocal insulating solutions were selected.

To make a traditional family farmhouse suitable for a new generation, Aixopluc decided to rethink the self-built garden structures that surrounded the building, while making the best of the microclimate that had arisen as the site became surrounded by (tall) apartment blocks over the years.

In Aixopluc’s ‘band of architects’ there is no room for self-importance or competition. Instead, they practice collaboration and strive to create an informal network that extends beyond the studio, and will ultimately outlast it. Most of the inhabitants of their projects take an active part in shaping their environments, which are designed to last, age with their users and anticipate future eventualities. To support this approach, the » team is constantly conducting research into smart fabrication techniques. Its Homeful System, for example, offers domestic modular components that allow for fast and cheap refurbishing of long-time abandoned buildings. Amalgamating functions on minimal floorspace, the system is designed to leave maximal space for a home's inhabitants to enjoy as they see fit. Shelterhood, a spin-off of the company, in turn, is an answer to the question of whether our furniture could move along with us, both in time and space, from town to town, from generation to generation, shifting and adapting to our life's changing needs. Described as a family of portable and ambulant shelters, the system makes use of a CNC router and plywood boards, enabling easy adaptations.

But, Monné stresses, building at all is a responsibility that shouldn't be taken lightly. 'We recognize that it is not possible to build without destroying or breaking. 99.99 per cent of the construction industry is actually destructive. Therefore, we need to be very careful in designing architectures that hopefully bring a renewed, vigorous and fair life to an ecosystem.' **FK**



Using low-cost, lightweight building materials such as CLT panels and thin steel tubes, the studio minimized the impact of the former farmhouse's new structure. Bedrooms were placed on the northeast side, so that they catch the low morning sun in winter, and were covered in thick cork panels to insulate them at night.

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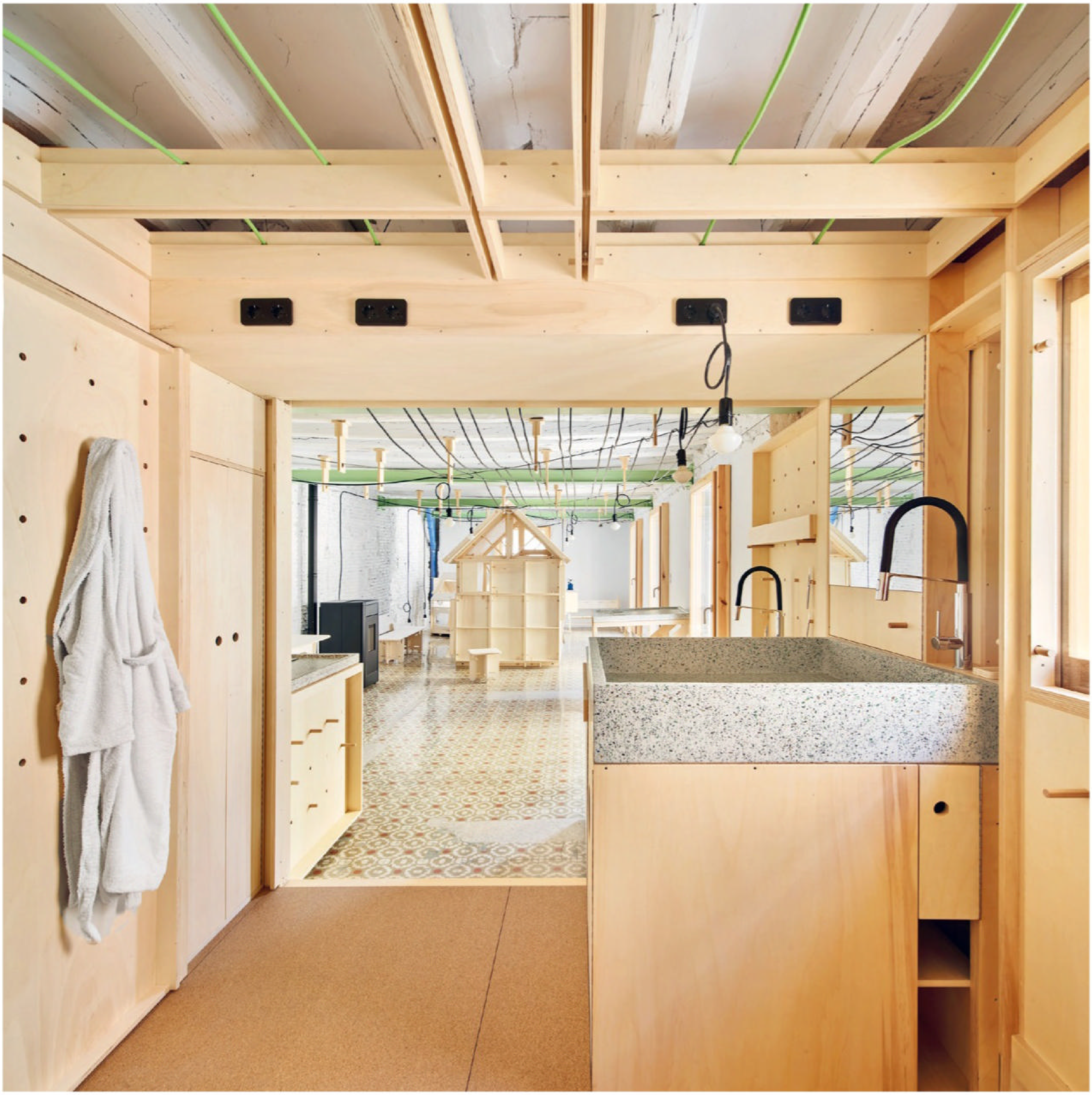
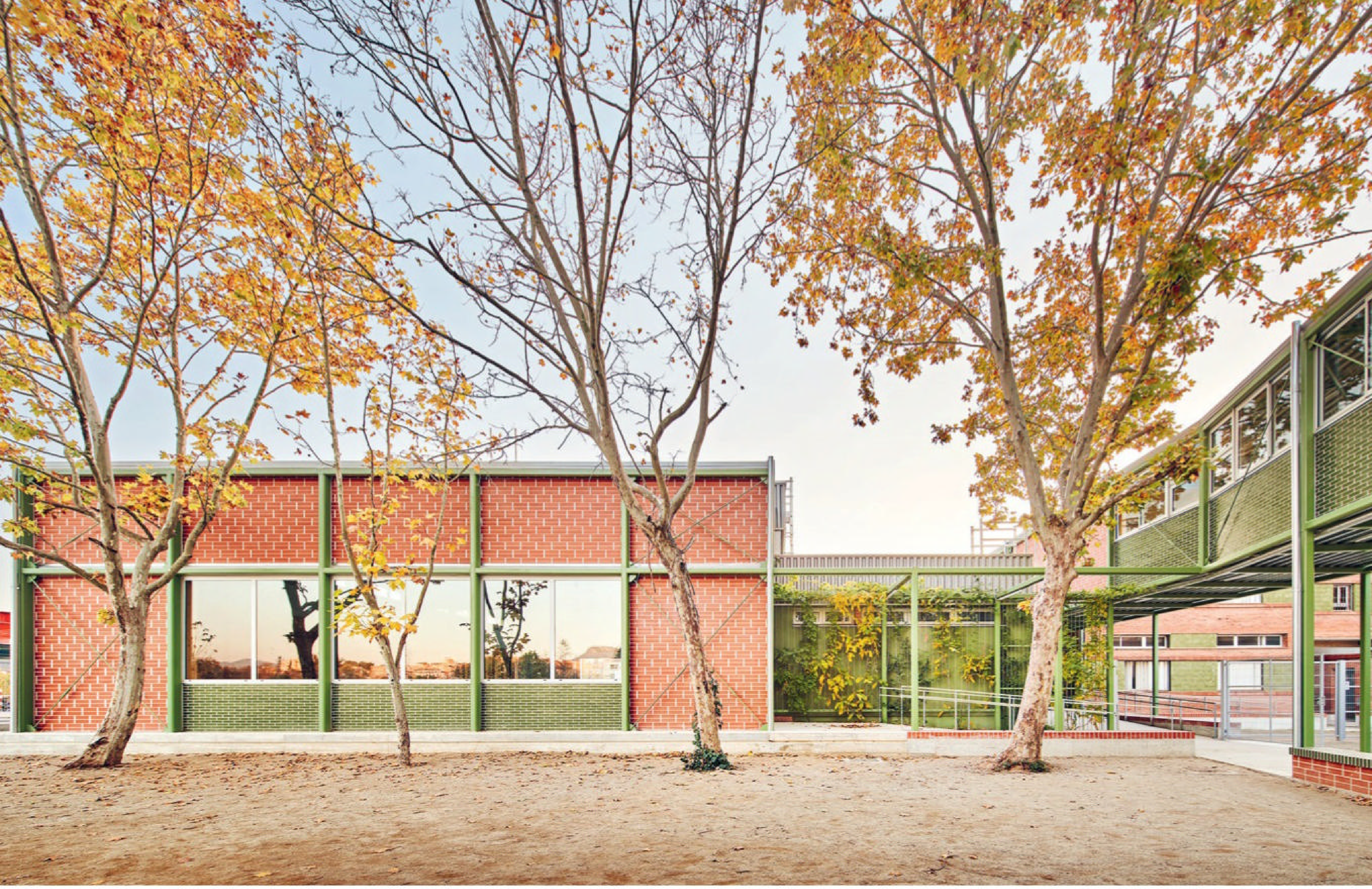


In renovating a vacated Reus apartment-cum-photo studio for future rental, Aixopluc condensed all amenities into one corner, freeing up the rest of the space 'to welcome unpredicted life'. The studio's component-driven design approach, which is reflected through its Homeful System, allows for endless reconfigurations.



The new volume of Aixopluc's extension of the Badia I Margarit High School in Igualada, Spain, uses a prefabricated concrete structure made just 70 km from the site. The different porosity levels of the building's termoarcilla walls suit the indoor programme and the façade's orientation. Aixopluc collaborated with architects Alex Gallego Urbano, Jordi Adell Roig and Gerard Puig Freixas on the project.

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'99.99 PER CENT OF THE CONSTRUCTION INDUSTRY IS ACTUALLY DESTRUCTIVE'

FLÉTTA

Courtesy of Flétta

Although working with waste may be more sustainable, it's not necessarily circular. By thinking ahead, Icelandic Studio Flétta is setting out to add infinite afterlives to existing materials.

Hailing from a country rich in natural resources, Icelanders Birta Rós Brynjólfsdóttir and Hrefna Sigurðardóttir have founded a product design studio on working with an *unnatural* resource: waste. 'We saw that most materials in Iceland are imported and then exported again for recycling,' says Sigurðardóttir, 'so we became eager to use the materials here, where they become waste.'

Their collaboration began in 2014 with a project called Haugfé. Named for a word from the Viking age that refers to the practice of burying the deceased with treasured belongings like weapons and jewellery, Haugfé sought to reframe industrial waste in Iceland. They and a friend visited manufacturers and analysed their waste, made the materials available to others, held pop-up material markets and shared their database. 'Although we had good feedback and people were interested, we could feel that most of the materials were still not seen as valuable,' says Rós Brynjólfsdóttir. Instead of considering their experiment unsuccessful, the duo decided to start using the materials themselves, founding Flétta in 2018.

Elfur Hildisif Hermannsdóttir

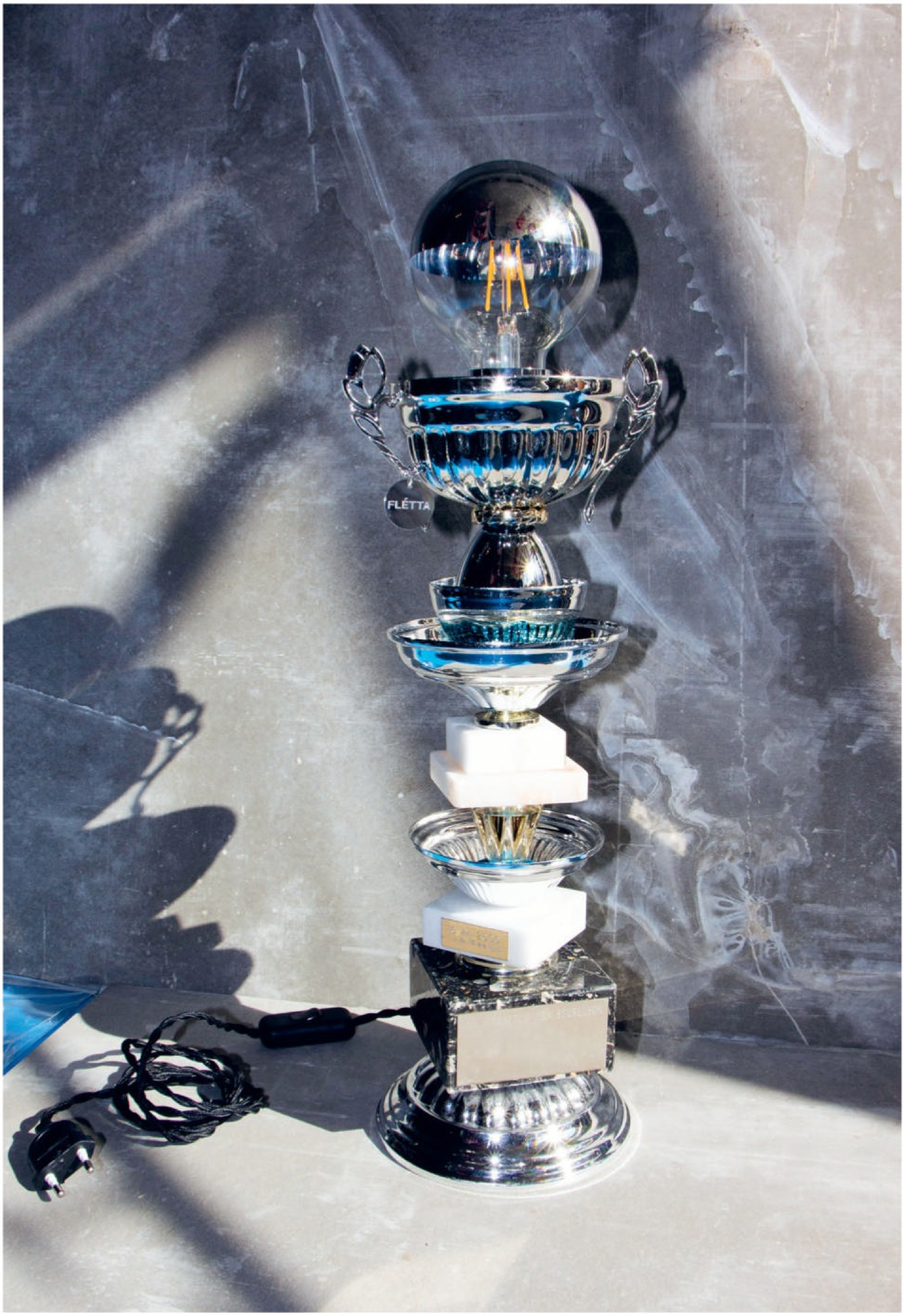
Their core value – 'working with "excess materials" to underline the value of what would otherwise be squandered', as Sigurðardóttir describes – is a fitting concept for today's polluted world, where the scarcity of raw organic materials is a growing problem. But for Flétta, it's not enough to stop there. 'We think about what will happen next so that the material doesn't fall out of the circle,' says Rós Brynjólfsdóttir. To enable this post-reuse potential, materials are mixed as little as possible and the use of glue or resins is avoided. 'It should be possible to take the materials apart and reuse or recycle them after their lifetime as a Flétta product.'

Flétta's activities beyond the studio highlight the expanding role of designers in the circular economy. Continuing the tradition established with Haugfé, the creatives are passing on their ideas about the potential of waste through workshops, presentations and teaching posts. Since its outset, the studio has also maintained a takeback policy. Disused Flétta products can be returned instead of discarded, while broken items can be brought back for repair or reuse. Again, they haven't stopped there: they're currently experimenting with renting their products for a monthly fee.

Now, the process Flétta initiated with companies is also happening in reverse, with local brands commissioning them to come up with inventive ways to reuse their waste. But adopting this role comes with a caveat. It can feel like finding temporary solutions to symptoms of a larger problem, says Sigurðardóttir, and the priority 'should always be to help the company waste less. A designer can analyse manufacturing processes and see if anything could be better used.' Only then, adds Rós Brynjólfsdóttir, can you 'start looking at the waste and coming up with ideas for how it could be utilized – preferably as a substitute for virgin material in a product.'

While tackling such a serious issue, the designers believe it's important to imbue products with joy and humour instead of being 'preachy'. 'We're both optimistic by nature,' says Sigurðardóttir, 'and I think it's important to hold onto that – especially during today's challenges.' **TI**

For research project The Icelandic Glass – which explored how to reuse materials left over from the local production of mineral wool, as well as ways to recycle the end product – Rós Brynjólfsdóttir (above left) and Sigurðardóttir (above right) collaborated with product designer Kristín Sigurðardóttir.

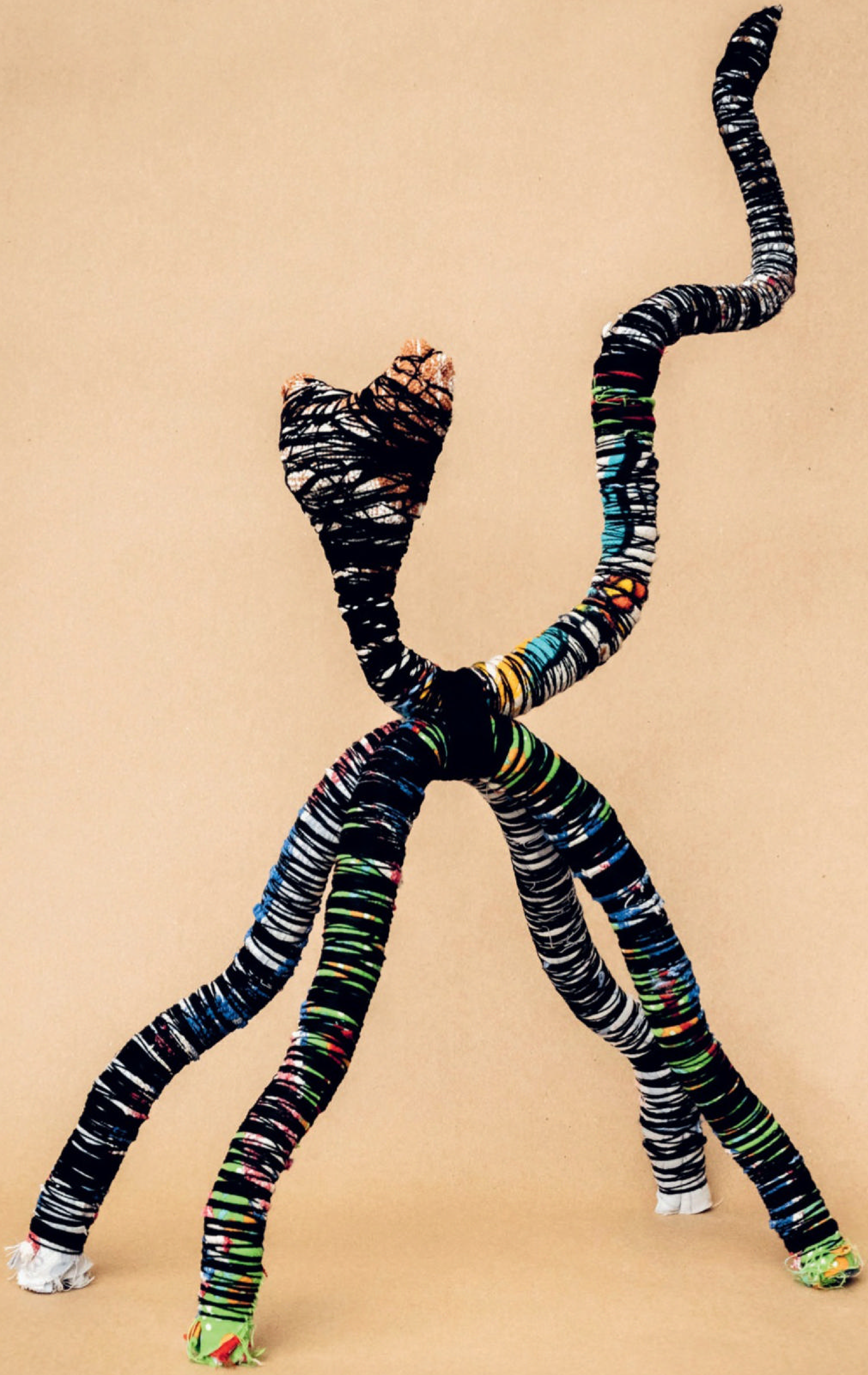


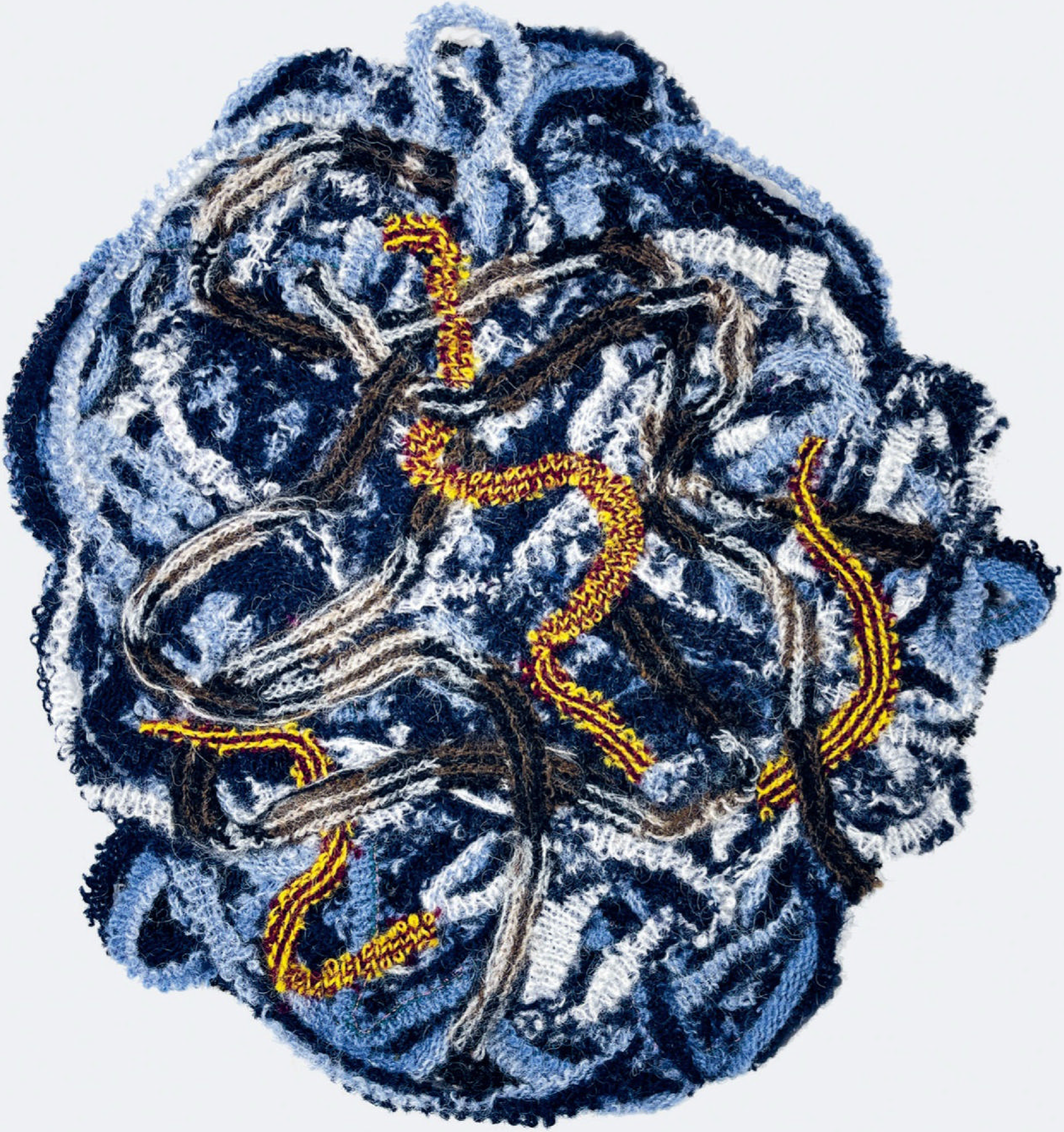
Courtesy of Flétta

LEFT **Flétta gained recognition with Trophy, a collection of lights, shelves and side tables made with the trophies that pile up in Iceland's sports clubs. Each screw and rod from the trophies is used again in the end products.**

OPPOSITE **Each year, gift store Rammagerin commissions a Yule Cat – a reference to the figure from Icelandic folklore that prowls the icy countryside devouring those without new attire to wear before Christmas Eve. Flétta's 2020 edition was composed of used children's clothing that would have otherwise been sent overseas for downcycling.**

Sunna Ben





Courtesy of Flétta

Sunna Ben

At DesignMarch 2023 in Reykjavík, Flétta and artist and textile designer Ýrúrarí collaborated on a playful performative edition of their Felt project (opposite), 'baking pizzas' using leftovers sourced from the Icelandic wool and knitting industry.

THE PRIORITY ‘SHOULD ALWAYS BE TO HELP COMPANIES WASTE LESS’

AIRBAG
FØLK

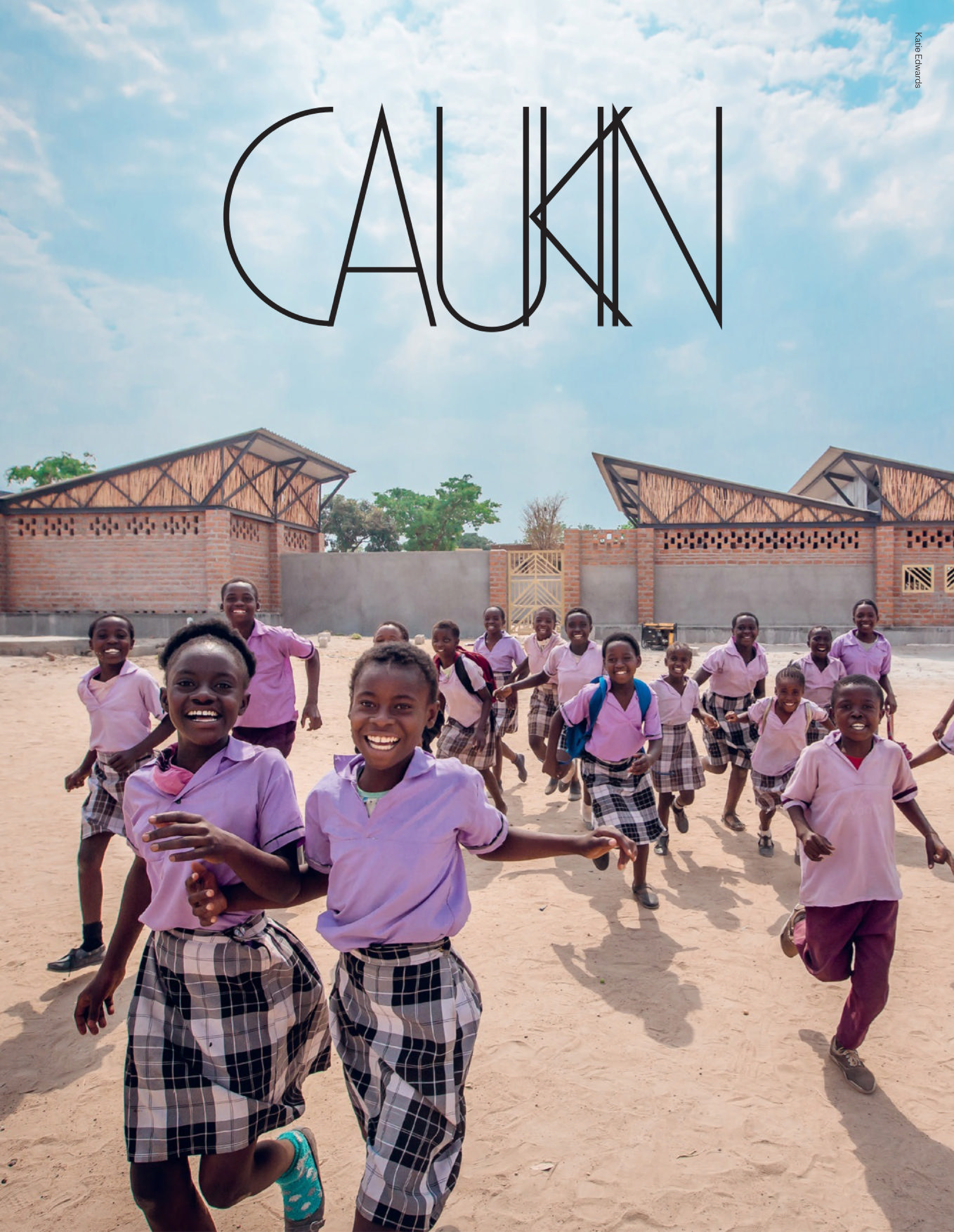
Fólk Reykjavík

ABOVE **The Airbag cushion for sustainable lifestyle brand Fólk Reykjavík reuses airbags that would typically end up in landfills.**

OPPOSITE **Worn-out jeans are turned into rugs in Denim on Denim on Denim on Denim, a collaboration with fashion designer Steinunn Eyja Halldóttir.**

Saga Sig

CAUKIN



Katie Edwards

For Caukin studio, community consultation and engagement secure the longevity – and social sustainability – of its user- and climate-centric projects.

Canada, the UK and Indonesia: These are the countries the founding members of London- and Cardiff-based Caukin studio hail from, and that the firm is named after. Joshua Peasley, Harrison Marshall and Harry Thorpe met while studying architecture and it was while working on realizing their first real project – 'as a group of enthusiastic, naively ambitious students' – that they experienced the rich exchange of knowledge that comes from working with end users and local materials, logistics and construction approaches. It's what triggered their continued collaboration, which is defined by an effort to thread a positive social, environmental or economic impact into all of their projects, no matter how charitable *or* commercial the brief.

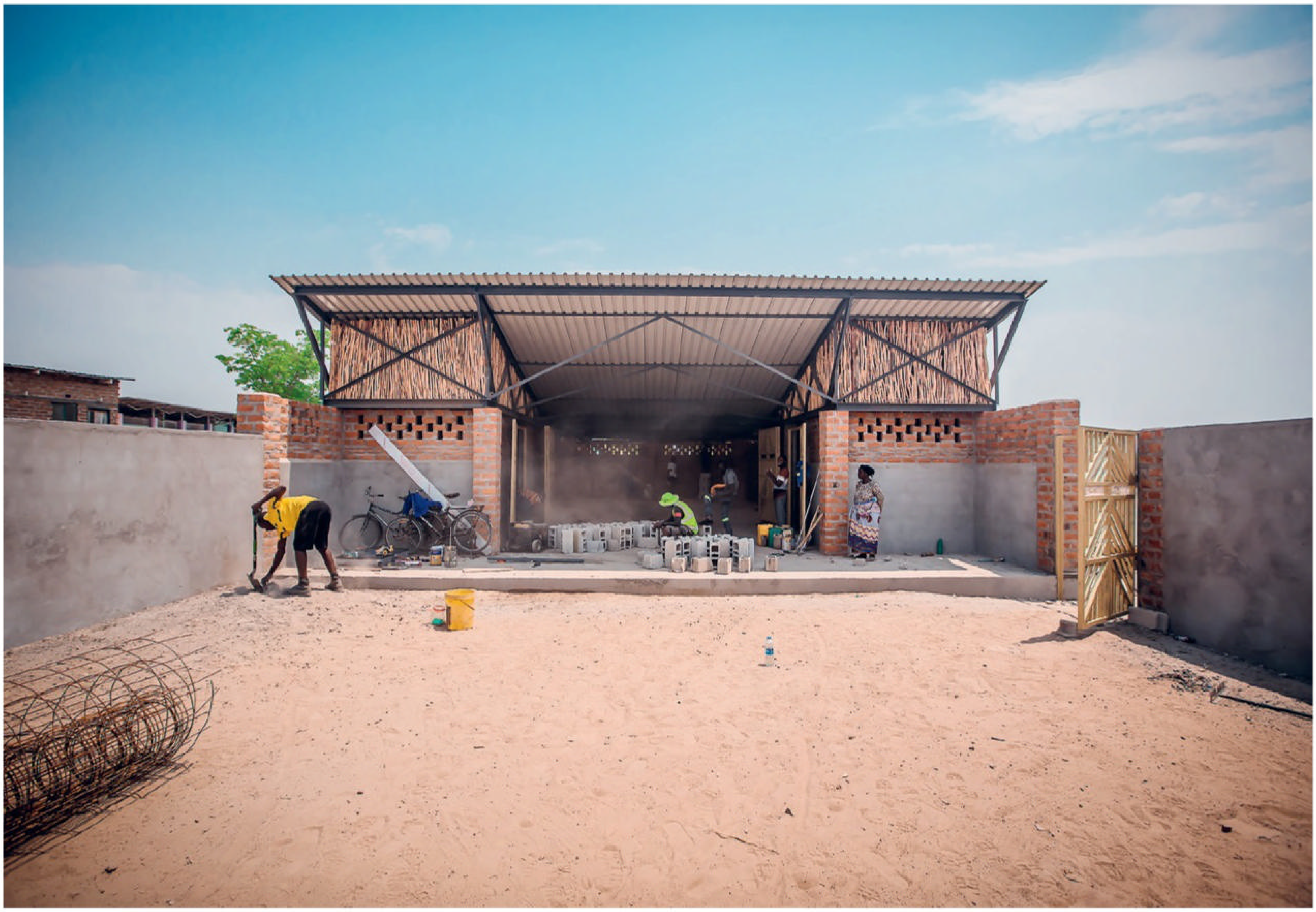
Making sure a project effects meaningful change starts with a researched understanding of the larger impact goals in the country and region they work in, as well as the local built sector. 'Due to the nature of our work in international development projects, working in remote locations and with local craftspeople, we are attuned to approaching design briefs with low-tech solutions in mind,' says Thorpe. 'Often our projects will start out by looking at the vernacular style.'

The studio's approach relies heavily on an open and demographic design process that consults and engages the local community and harnesses their local expert knowledge. Caukin believes stakeholder ownership is pivotal in ensuring successful longevity and social sustainability. It's not only important to the team to ensure that a project fits the end user's specific needs, but also that any element of its designs can be looked after, replicated and adapted by the community after the project has been completed. 'From our experience the biggest area for spatial design to create social change, across all typologies, is through the considered and sustained effort towards equality of input. Starting from this position of parity can really help to identify areas of subconscious hierarchies and biases that exist within a context,' Thorpe adds.

Climatic extremes and issues such as earthquakes, cyclones and flash floods are often inherent to the locations of Caukin's projects, which ask for resilient solutions. Take the Ranwas School in Vanuatu, which is located in a cyclonic region of the South Pacific and deals with extremely high humidity levels, which led to issues with learning materials. »

ABOVE **The core team behind Caukin studio (L-R): Cassie Li, Joshua Peasley, Harrison Marshall and Harry Thorpe.**

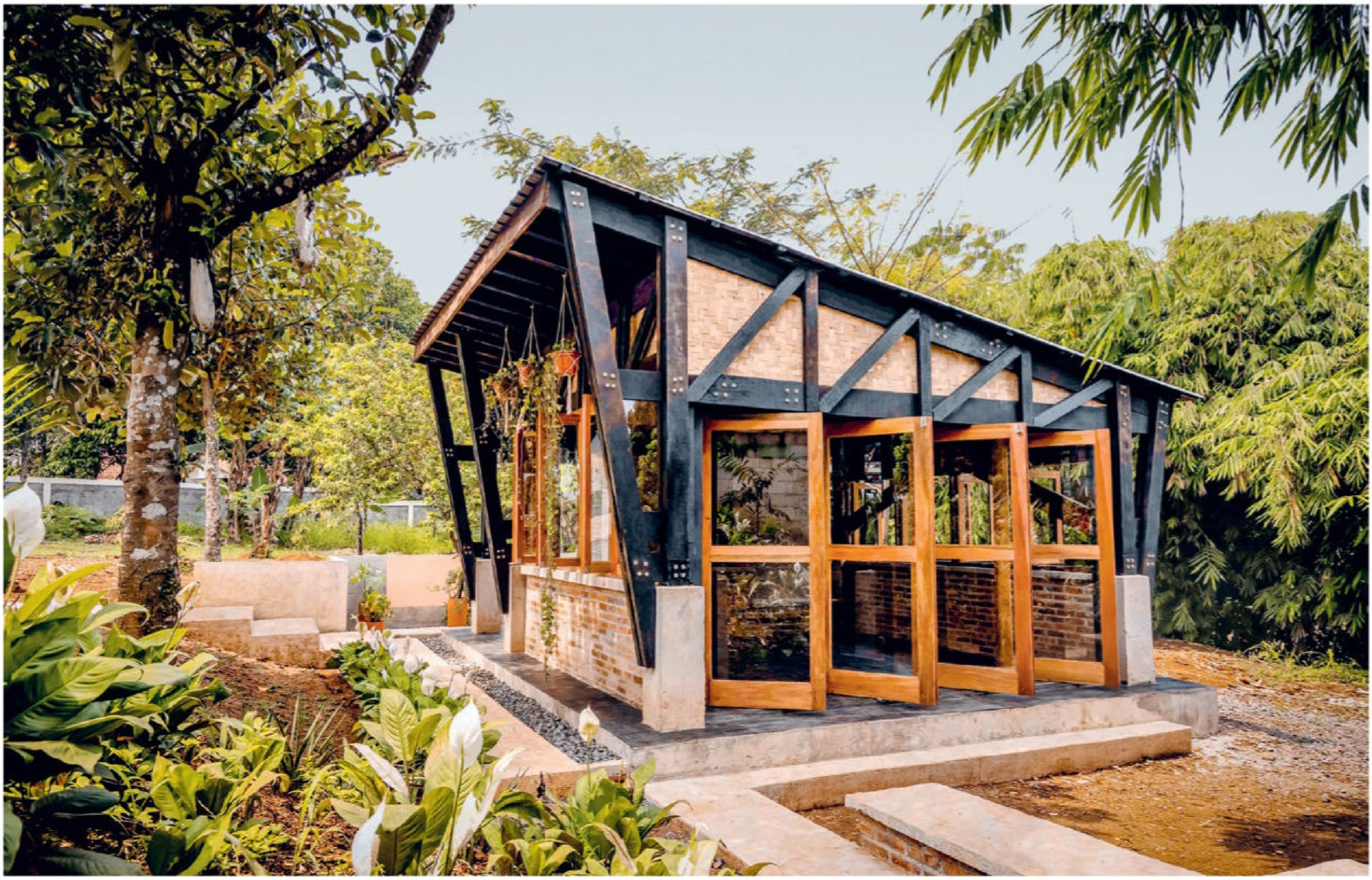
OPPOSITE **To realize the Shiyala Kindergarten in Zambia, 22 international participants from architecture and engineering schools and practices worked alongside members of the local community.**



At the Shiyala Kindergarten, brick piers terminate in a raised plinth to protect the building from flooding, while hit-and-miss masonry work allows for natural ventilation.

Tasked with designing a classroom and library that could deal with these circumstances, Caukin partnered with Dr Vicki Stevenson and Dr Eshrar Latif (course leads of the MSc Environmental Design of Buildings at Cardiff University) to come up with a plan to naturally heat and ventilate the space while drawing the moisture-rich air away. The final design combines a heavy-duty timber portal-frame structure with local woven bamboo cladding and shutter windows with a polycarbonate and metal roof. Books are stored in an enclosed space that sports dark metal roofing to increase the air temperature (thanks to the sun) and maintain a drier atmosphere, while stack ventilation allows for a continuous flow of air, and an end-grain timber internal wall acts as a humidity buffer by absorbing moisture from the air.

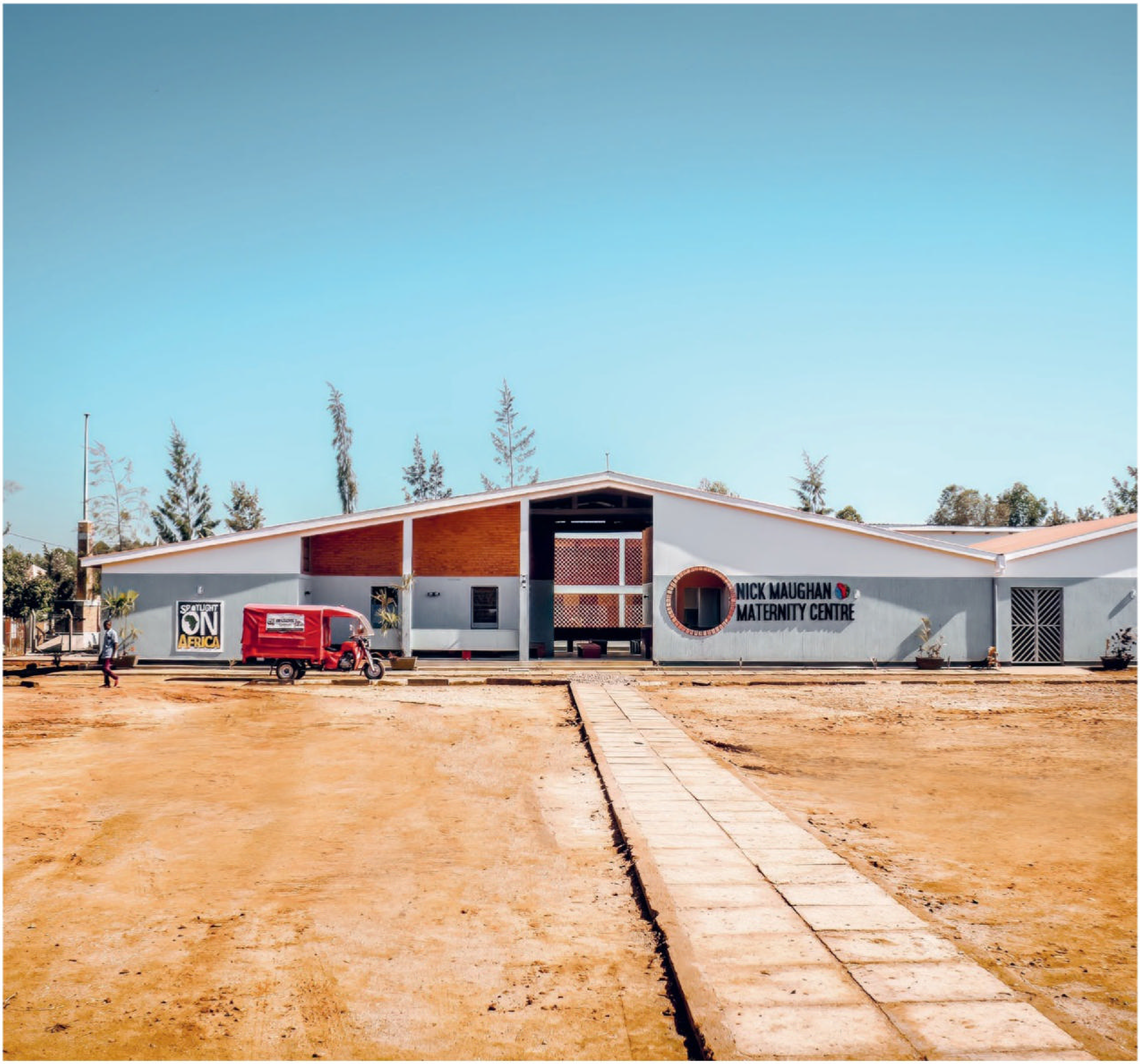
Caukin's social endeavours extend from project to practice. 'The global built environment sector is notorious for being behind on issues like diversity and gender equality,' says Peasley. 'We take pride in leading by example to tackle some of these issues; both in the way we approach projects (with a stakeholder lead structure) and in our employment practices. We strive to achieve an equal split of male and female workforces across our sites and often achieve more than a 50 per cent split of women in construction.' **FK**



Kung Photographs

‘THE BIGGEST AREA FOR SPATIAL DESIGN TO CREATE SOCIAL CHANGE IS THROUGH THE CONSIDERED AND SUSTAINED EFFORT TOWARDS EQUALITY OF INPUT’

The building that Caukin studio conceived for the Centre for Community Development and Social Entrepreneurship in Bogor, Indonesia, can function as a space for community events and training days as well as a Mushola (prayer room).



SPOTLIGHT ON AFRICA
NICK MAUGHAN MATERNITY CENTRE

Courtesy of Caukin

Caukin's design for the maternity centre at the Bukasakya Level 3 Health Centre in the Mbale district of Uganda aims to reduce the building's embodied carbon through the use of locally sourced natural materials, including timber and unfired earth bricks.

For the Bukasakya maternity centre's in-patient area, the designers strategically aligned a sequence of rooms with the birthing stages.

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INTERIORS FROM SPAIN

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Andreu Carulla

A growing number of hotels and eateries are embracing a zero-waste philosophy. They usually concentrate on food and packaging, but could the approach extend to interior design as well? Robert Thiemann talks with Ade Herkarisma, the director of architecture and development at Indonesian lifestyle and hospitality brand Potato Head, and Spanish designer Andreu Carulla about the future of hospitality, seen through the lens of waste.

Potato Head operates a creative community in Seminyak on the Indonesian island of Bali and a restaurant-club in Singapore. They're places where 'art, music, food, design and wellness come together', claims Herkarisma, who also oversees the business's product R&D and provides sustainability advice. The company's dedication to a comprehensive zero-waste philosophy that covers not just food and beverages but also architecture, interiors and design sets Potato Head apart from most other hospitality providers. 'We continuously look for ways to reduce waste and consider what it might become,' adds Herkarisma.

Andreu Carulla joins the chat by calling in from Banyoles. The designer heads a studio in the north of Spain and developed the interior and products for Gerona-based Normal, the more reasonably priced sibling of one of the world's top restaurants: El Celler de Can Roca. A variety of goods manufactured from leftover materials are displayed in Normal, including letters crafted from leather offcuts that reflect the daily menu. He claims that 'trash can be the ideal raw material for new things'. The problem is that the industry is not yet prepared to process rubbish more extensively. Full disclosure: Herkarisma and Carulla are working together on a zero-waste restaurant that will debut next year in Singapore. Carulla is creating furniture out of rubbish, and the architects at OMA are in charge of the architecture. The kitchen is overseen by renowned chefs Will Goldfarb (chef at Room4Dessert in Ubud, Indonesia) and Matthew Orlando (former chef at Amass, a high-end Copenhagen restaurant that recently declared bankruptcy).

ROBERT **Why is Potato Head committed to a zero-waste policy?**

ADE **Bali's tourism sector alone is responsible for 13 per cent of the rubbish dumped there. Each traveller produces roughly 1.7 kg of rubbish each day. Waste that winds up in our oceans and backyards has poisoned our environment. As Potato Head is a contributing factor, we need to lead by example. We must decrease as well as recycle our waste. Our children won't be able to appreciate the beautiful nature we have if we don't act now.**

ROBERT **What exactly does your policy entail?**

ADE **In 2017, we began by identifying what we put in our rubbish bins and separating everything on site. We supplied organic waste from composting to a pig farm. All valuable inorganic elements were returned to a third-party reseller. To find new uses for materials like LDPE, PVC and Styrofoam that have no commercial value, we established a Waste Lab. We're working hard to reduce the amount of residue that can't be recycled, which is now at 3 per cent, to zero by 2024. When we first began in 2017, we were at 51 per cent. The last remnants, such as nappies, cigarette butts, hand gloves and white tissues, have always presented us with a dilemma. We're working on solutions together with companies and designers like Andreu.**

ANDREU Designers are part of the problem but can also contribute to the solution. For designers and architects, waste and discarded materials present a huge opportunity. You can industrially produce something similar to what's currently on the market by using inexpensive virgin material, but that involves damaging the environment. But if you work with rubbish, you have the chance to make something truly original that deserves to exist. You may work together with undiscovered artisans or skilled craftspeople to help them advance the craft business, find new methods to express yourself and reduce waste. That can all be accomplished in one go. That's why I want to learn more about recycling. It genuinely inspires me. »

ROBERT **Can you give an example of a product that results from recycling waste?**

ADE **We attempted to use PVC as a bonding agent for road paving in one of our early tests. We melted the plastic, combined it with sand, and used that mixture to form paving blocks. Next, we broke down the Styrofoam into a texture that was almost mushy, and combined it with shredded plastic or crushed seashells. We made a variety of hotel amenities out of that material, including a soap dispenser, which has been selected for the RoPlastic Prize 2023 [a Milan Design Week-based award aimed at the innovative reuse of waste materials].**

ANDREU We created a number of wearables and accessories for Roca Recicla, upscale restaurant El Celler de Can Roca's zero-waste initiative, by upcycling the square PVC pouches used for vacuum cooking. Each week, the restaurant requires about 50 of these single-use bags. They can't be recycled in the conventional sector because of their mixed-plastic composition. A local non-profit that hires women at risk of social exclusion simply washes the pouches and frames them with striking cotton straps to produce a new patchwork-like material for bags and aprons.

ROBERT **You see designers as part of the problem. Shouldn't they say no to a commission more often and refuse jobs that result in superfluous products and waste?**

ANDREU That's what you should do in the end. But to accomplish this, all designers must work together. We could all sign a pledge to be more considerate when designing new products, or we could persuade the industry that it would likely be profitable to create more distinctive products with recycled materials. Items with a distinction that are truly worth being on the market. Yet it's incredibly challenging to say no. We also need to manage our own business.

ROBERT **Will doing less, reusing what's on site and upcycling waste lead to new aesthetics, or do we need to sacrifice beauty?**

ANDREU For a Spanish beer brand, we created a chair made of 100 per cent post-consumer recycled plastic that resembles a chair made of virgin material. I suggested adding some coloured dots to indicate that the product was created from waste, but the manufacturer was unable to do so. The beer company then requested that I create an outdoor chair that would be replicated as many as 3 million times. Although I was willing, I only wanted to utilize post-consumer plastic. The company informed me it wouldn't be feasible due to the high cost. Eventually, I discovered a business that could create the chair using post-consumer plastic, but in a deeper shade. But that chair doesn't reveal anything about its recycled

‘I BELIEVE THAT OBVIOUS LUXURY IS OVER. WE CAN NO LONGER AFFORD IT’

origins either. With the Potato Head initiative, on the other hand, we make it very explicit that items are manufactured from waste materials.

ADE **We don’t compromise on aesthetics, but beauty is also a matter of opinion. For us, showing the real material and developing a narrative to convey a message are equally important. Returning to the soap dispenser, suppose we create one for a certain hotel brand using waste from that hotel. Users will then understand that there is a message in the product: ‘It was manufactured from the rubbish in our backyard. If we don’t pick up after ourselves, our litter will end up in the ecosystem.’ Hence, a product manufactured from waste conveys a tale about its origins due to its richness and material irregularity. It conveys a message that makes people more motivated to tidy up. Recycling has been practised for decades, but it rarely receives the attention it deserves. It can be challenging to influence people’s perspectives so they can see the need to recycle.**

ROBERT **Because you want them to convey a message, you therefore prefer that these upcycled products look different from industrial products. There must be a lot of people out there who are not yet prepared to accept this new aesthetic. Have you found that to be the case?**

ADE **The goal is always to produce beautiful products. Instead of displaying waste, we want people to think critically about how materials are used. They will learn that the product is manufactured from waste at the conclusion of the discourse it sparks. Younger generations place a high value on this; they are curious about the origins of products and appreciate when there’s a valid rationale.**

ANDREU By the way, there’s a misunderstanding concerning the aesthetics of objects made of waste and recycled materials. You don’t need to see various particles, and they don’t even need to look rough. The raw material you use and the production »

'WE NEED VISITORS TO REGENERATE THEIR TRIP'

method you employ are both important. Techniques can be used in such a way that you hardly even notice that an object is made of recycled materials.

I agree that not everyone recognizes the appeal of recycled goods. That's because the recycling industry is still in its infancy. Many people still adhere to outdated concepts of luxury that focus on commodities like gold, marble and gloss. I believe that this obvious luxury is over. We can no longer afford it. New languages that develop and mature over time will give rise to a new luxury. We'll grow to love it and adapt to it.

We won't be working with virgin plastic in the future. The basis for all items will be recycling. But to get attention and spread awareness, we're now compelled to overexplain and overexpress.

ROBERT

Ironically, when you develop a genuinely exceptional location and make it a destination, visitors from all over the world will flock there for the experience, which eventually makes it much less sustainable. How would you go about making a hotel's entire ecosystem sustainable? Can you picture having a visiting policy?

ADE

Without a doubt, we don't want visitors to fly in, consume and then leave rubbish. The future of hospitality won't only be about having a good time. We need visitors to regenerate their trip and participate in community-based environmental efforts. All our activities, from rubbish collection to farm planting, require participation and contribution from visitors.

One of our brands, the Wasted Collective, conducts two walks designed to connect us with the local community, the planet and ourselves. The 'waste walk' is a leisurely stroll on the beach with a small group. You obtain a bag, pick up trash as you walk, and then deposit it in our R&D bin. In the second stroll, you collaborate with a neighbourhood farming initiative in replanting indigenous vegetation that has vanished due to commercial tourism. You also gather plants and herbs, which you then prepare for lunch. We think that these straightforward actions will alter people's mindsets. Maybe they'll start to value local food preparation and harvesting more than a fine dining experience.

We also offer our visitors a 'follow-the-waste tour'. We show them our back of house, including the way we manage waste up to the production line. They then join a waste workshop to learn how to recycle. They can apply some of this knowledge back home to change, ever so little, how they live.●

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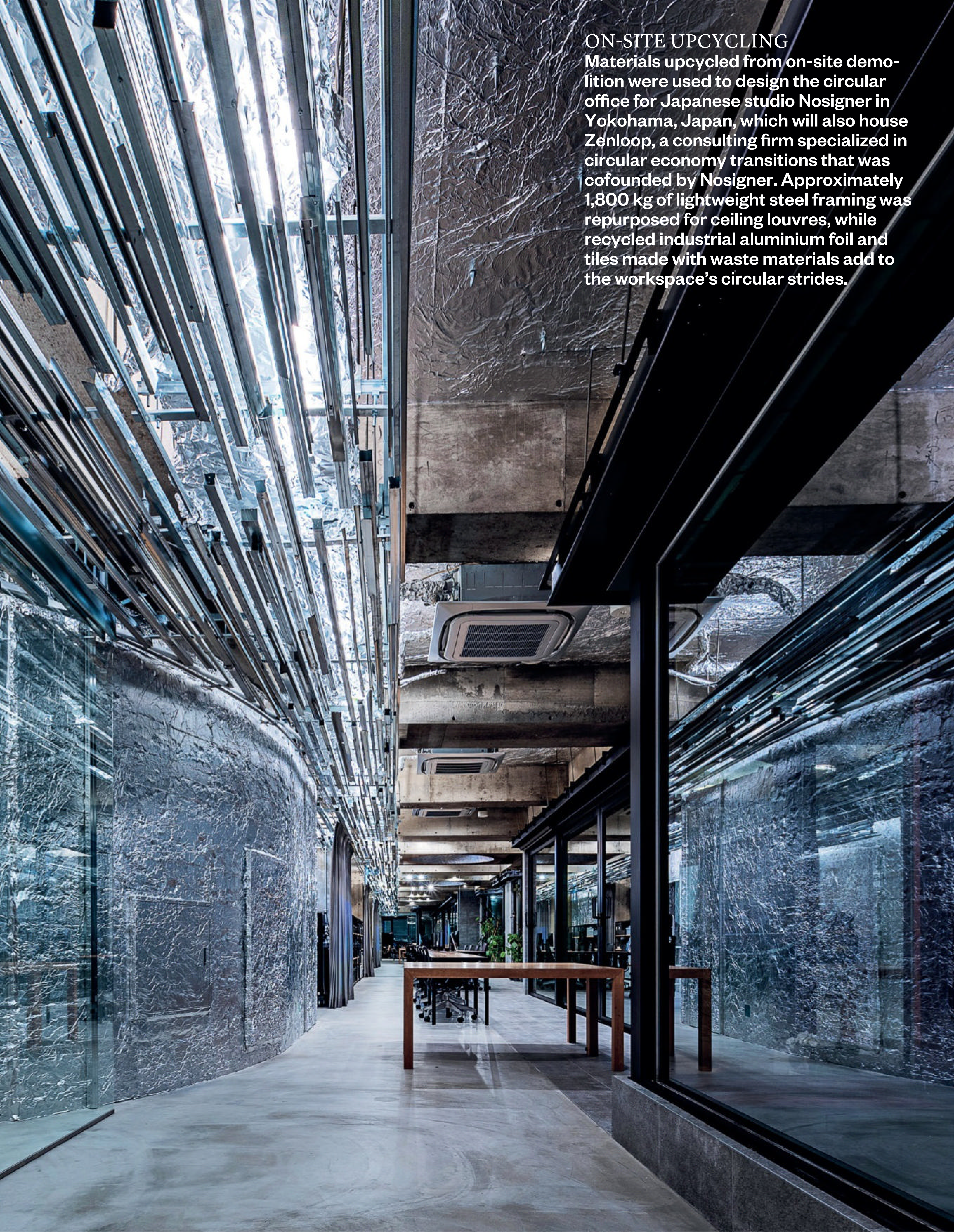
INTERIORS FROM SPAIN

CIRCULAR STRIDES

What does a sustainable space look like? A few years ago this question would have conjured up a fairly standard mental image. But the development of new materials, recycling technologies and production possibilities are exposing a fuller picture, pushing designers to be more creative with what it means for an interior to look and feel circular. The projects in this issue's Look Book demonstrate the myriad ways in which sustainability can be practised – and challenge our aesthetic expectations in doing so. LGM

Yuichi Hisatsugu / Nitehi Works

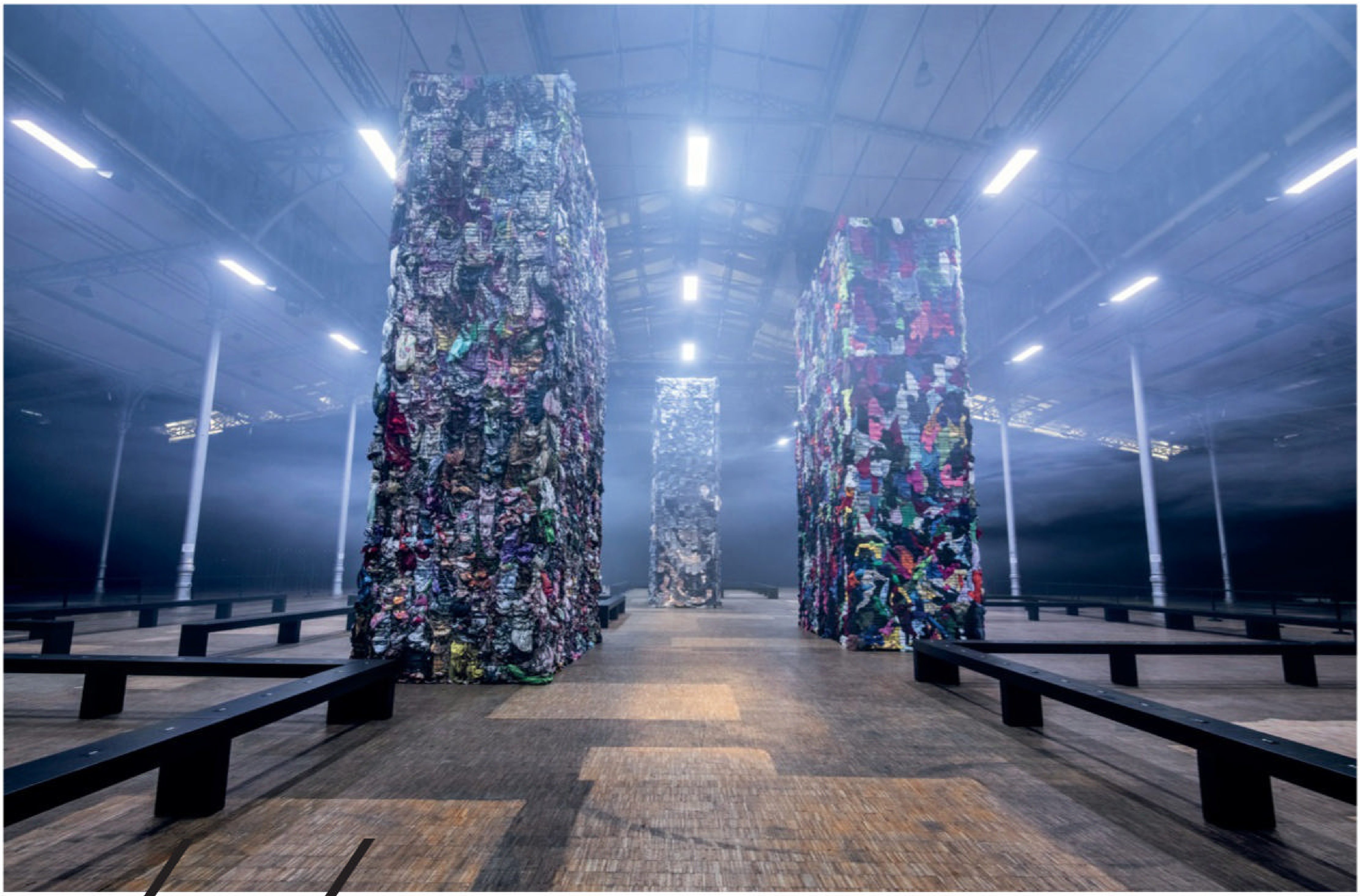


ON-SITE UPCYCLING

Materials upcycled from on-site demolition were used to design the circular office for Japanese studio Nosigner in Yokohama, Japan, which will also house Zenloop, a consulting firm specialized in circular economy transitions that was cofounded by Nosigner. Approximately 1,800 kg of lightweight steel framing was repurposed for ceiling louvres, while recycled industrial aluminium foil and tiles made with waste materials add to the workspace's circular strides.

CLOTHING LOOP

Constructed inside Paris's Grande Halle de La Villette, the set for Marine Serre's Rising Shelter collection presentation featured three 8-m-tall towers filled with 1,300 kg of used clothing. Matière Noire and Marine Serre's set designer Remie Brier built the towers using vintage denim, silk scarves and t-shirts, which were returned to the studio post show to be used in future collections.



Courtesy of Matière Noire

BECAUSE THERE IS NO PLANET B
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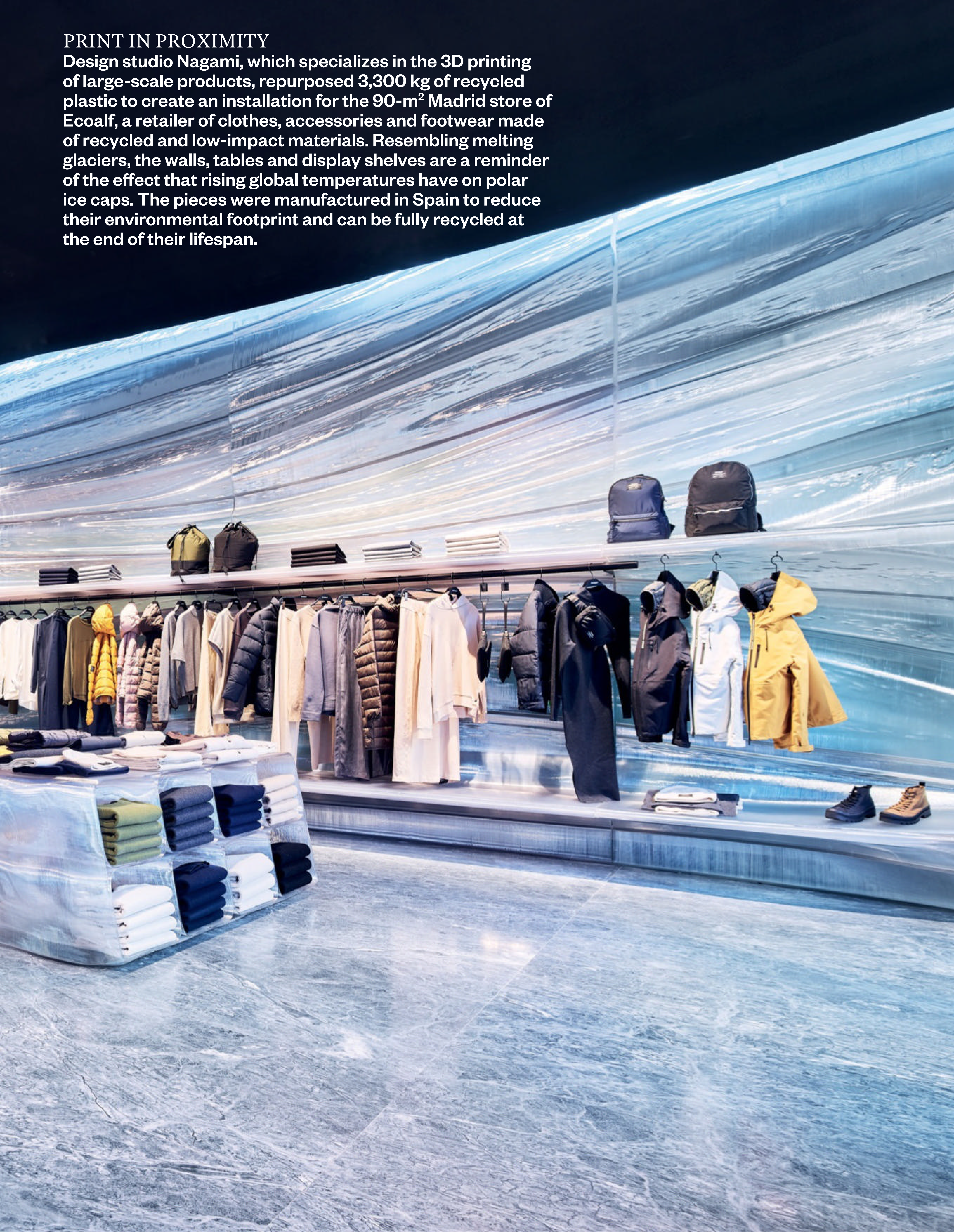
BECAUSE THERE IS NO PLANET B

Alfonso Quiroga

PRINT IN PROXIMITY

Design studio Nagami, which specializes in the 3D printing of large-scale products, repurposed 3,300 kg of recycled plastic to create an installation for the 90-m^2 Madrid store of Ecoalf, a retailer of clothes, accessories and footwear made of recycled and low-impact materials. Resembling melting glaciers, the walls, tables and display shelves are a reminder of the effect that rising global temperatures have on polar ice caps. The pieces were manufactured in Spain to reduce their environmental footprint and can be fully recycled at the end of their lifespan.



José Hevia

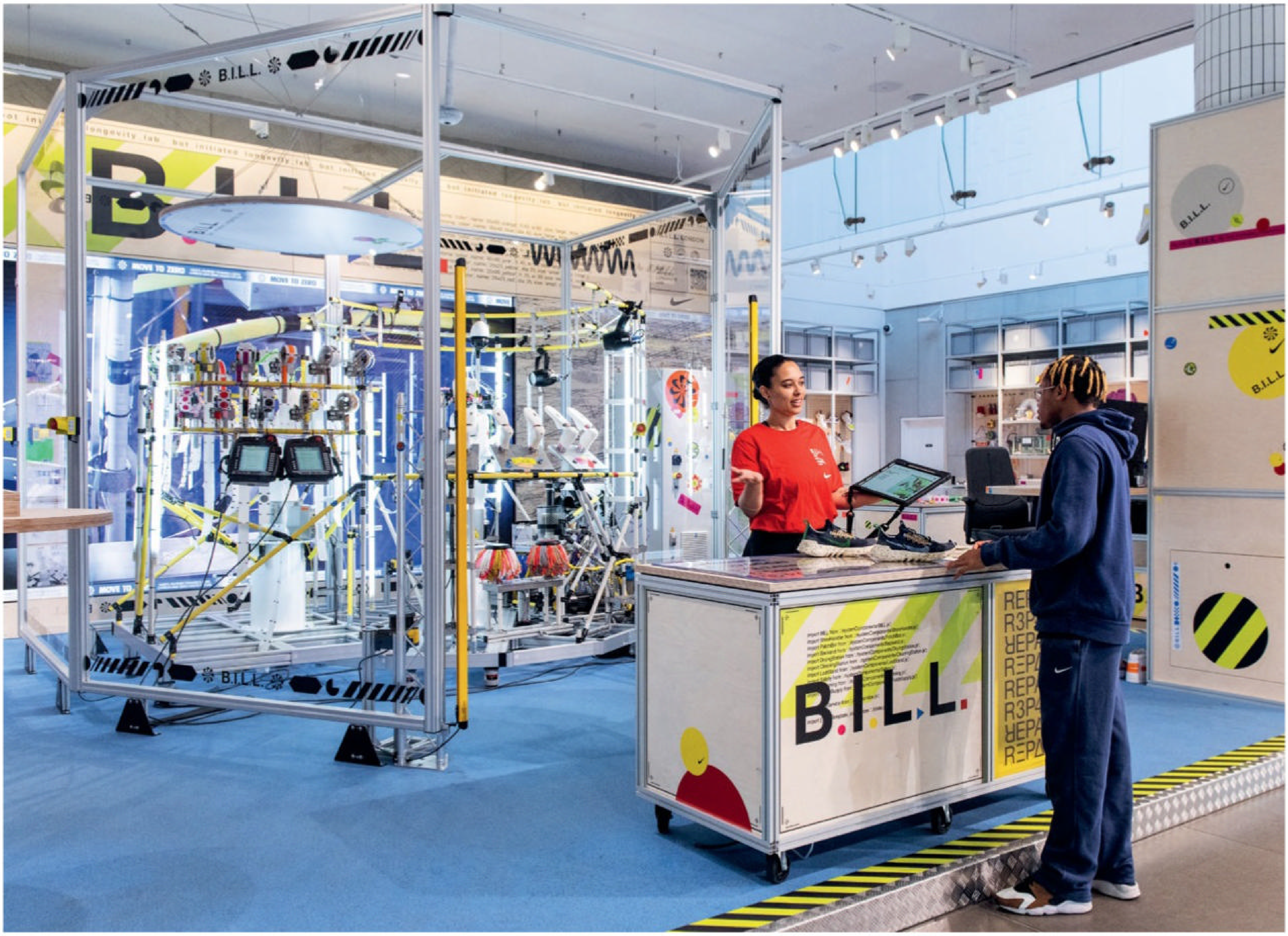
UNFINISHED AESTHETIC

Aptly named after the €10,000 budget allocated for its renovation, Takk Architecture's 50-m^2, stripped-back 10k House in Barcelona has an unfinished aesthetic. In addition to materials upcycled on site, Medium Density Fibrewood panels and local sheep's wool are among the primary elements used in the space. Surface materials like paint, plaster and tiles are eliminated where possible. Instead, the existing floors, walls and ceilings are cleaned and polished. The seams of the removal of the interior partitions are left visible. The functional configuration of the space was determined by thermal gradient studies, allowing the architect to regulate the interior climate without introducing new materials or unnecessary artificial cooling mechanisms.

73

ROBOTIC REPAIR

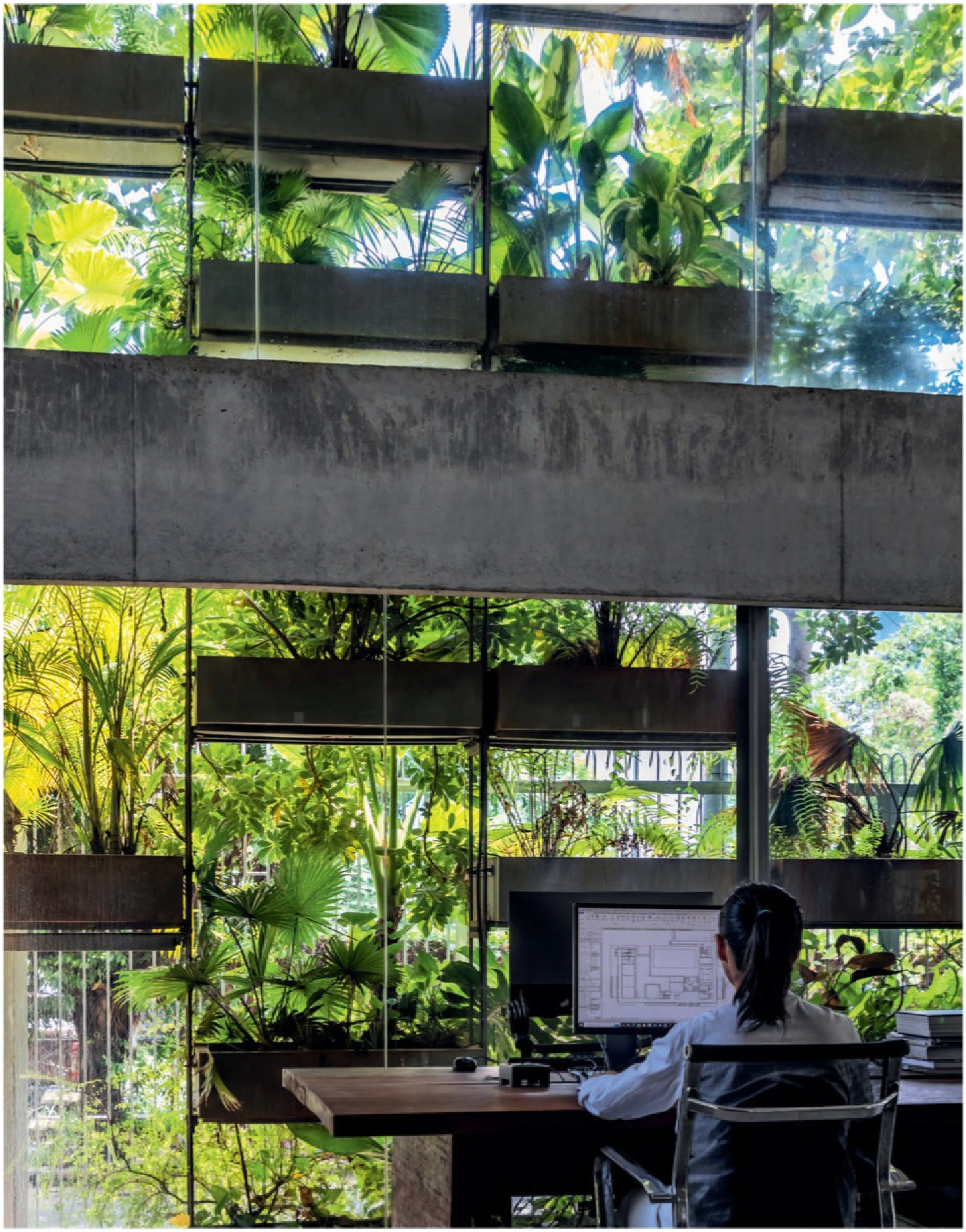
To extend the lifespan of its products and help the brand meet its circularity and sustainability goals, Nike has piloted circular shoe repair technology at its Nike Town London store. Named B.I.L.L. (Bot Initiated Longevity Lab), the system is robot-augmented and is capable of cleaning and repairing shoes in as little as 45 minutes. Shoes are loaded into the machine and a 3D model is created to identify the areas that need to be improved. Customers can select patches to repair different areas, adding an interactive element to the maintenance.



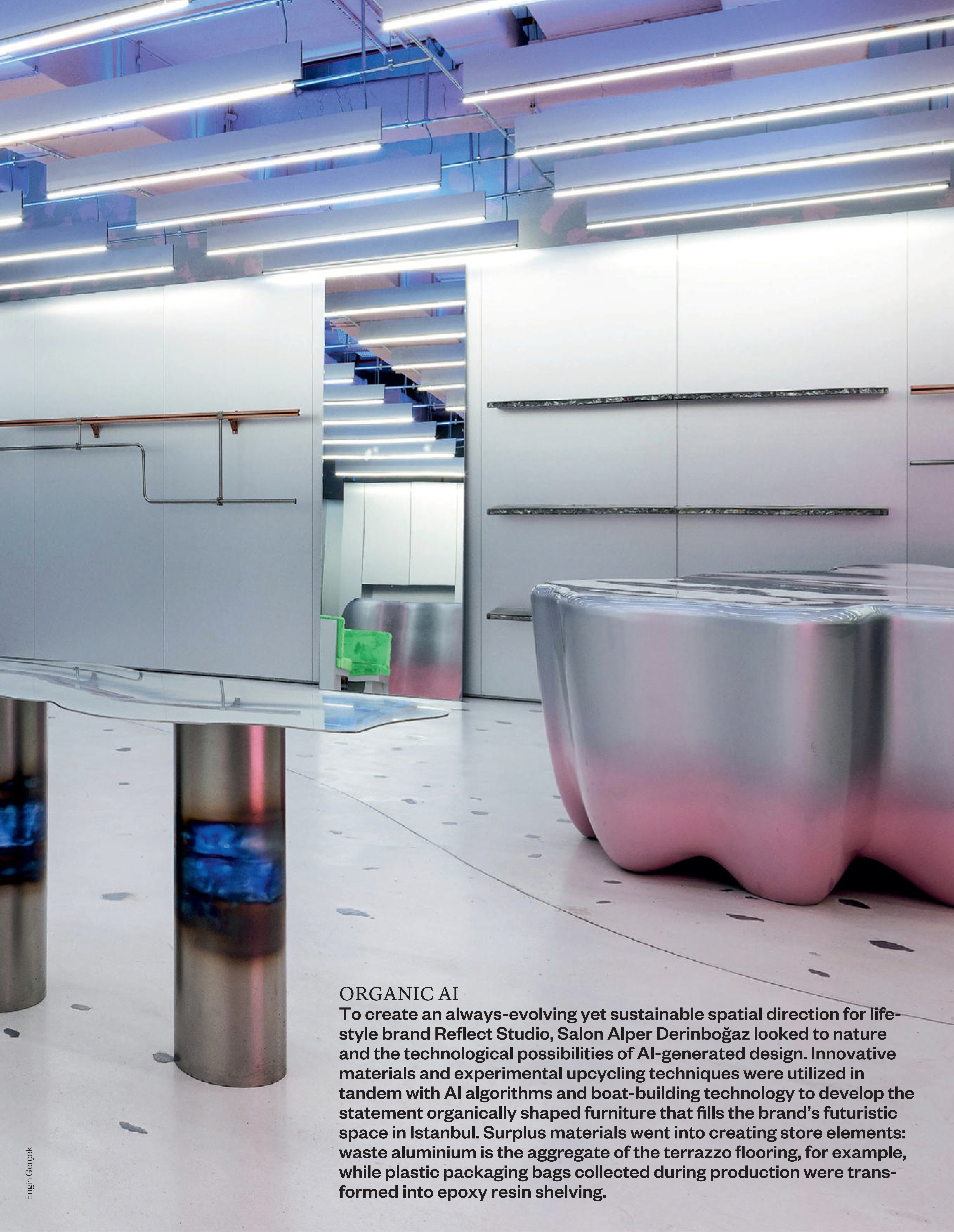
Courtesy of Nike

VERTICAL FARMING

The façade of Vo Trong Nghia Architects' self-designed office in Ho Chi Minh City, Vietnam, incorporates vertical urban farming infrastructure. Modular boxes fixed to the concrete exterior of the 1,386-m^2 building are planted with fruit trees, vegetables and herbs, which are irrigated with stored rainwater. The ecosystem of plants is visible from the mostly concrete interior, bridging the connection between those working inside and nature. Additional planting space on the rooftop brings the building's total yield of fresh produce to over 900 kg per year. Addressing local environmental issues like pollution and the urban heat-island effect, the vegetation improves air quality and creates a microclimate, filtering light to naturally cool the space.



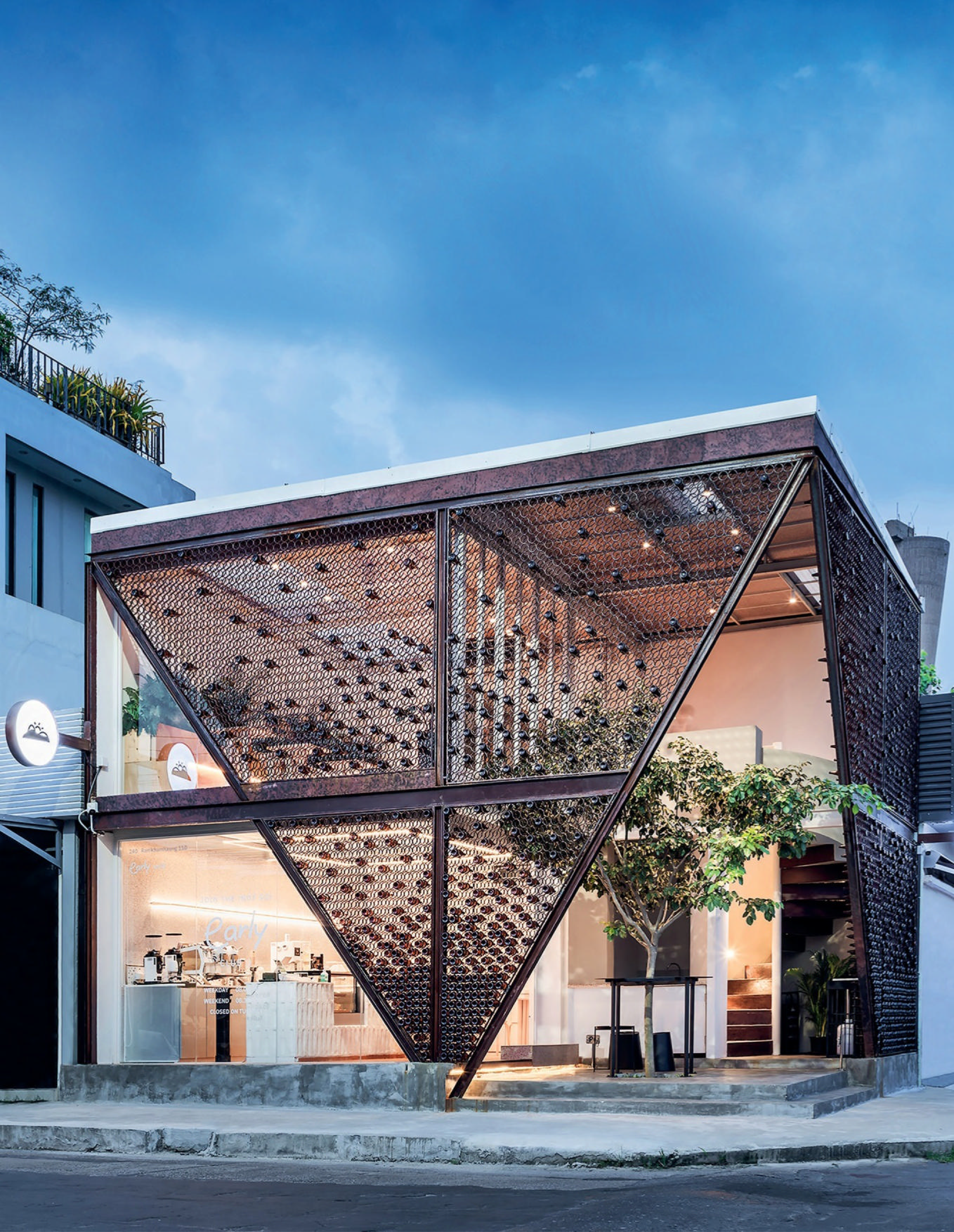
Hiroyuki Oki



Engin Gerçek

ORGANIC AI

To create an always-evolving yet sustainable spatial direction for lifestyle brand Reflect Studio, Salon Alper Derinboğaz looked to nature and the technological possibilities of AI-generated design. Innovative materials and experimental upcycling techniques were utilized in tandem with AI algorithms and boat-building technology to develop the statement organically shaped furniture that fills the brand's futuristic space in Istanbul. Surplus materials went into creating store elements: waste aluminium is the aggregate of the terrazzo flooring, for example, while plastic packaging bags collected during production were transformed into epoxy resin shelving.


Early
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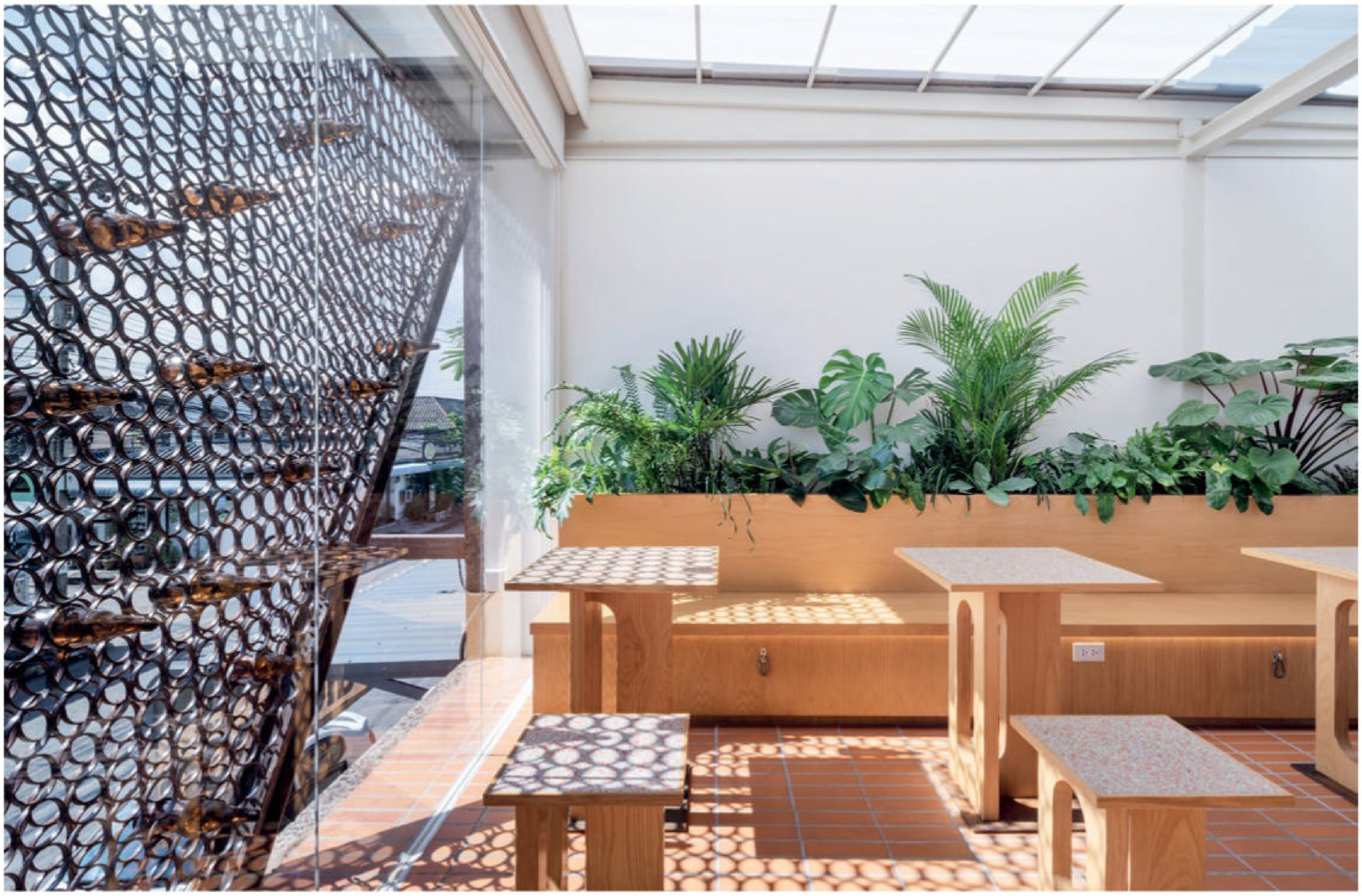
Thanapol Jongsiripipat

WASTE ASSEMBLY

Spacecraft's design of the 120-m^2 Early BKK café in Bangkok extensively makes use of upcycled trash and other materials sourced in the surrounding neighbourhood. Re-board made entirely of milk cartons cut into small pieces is used for the door, ceiling, chairs and tables, while beer bottles and their shards appear on the façade and in a terrazzo countertop and restroom floor. The installation of solar panels on the roof, a waste separation programme, the inclusion of a second-hand clothing store, and a no-plastic policy further the circularity agenda.

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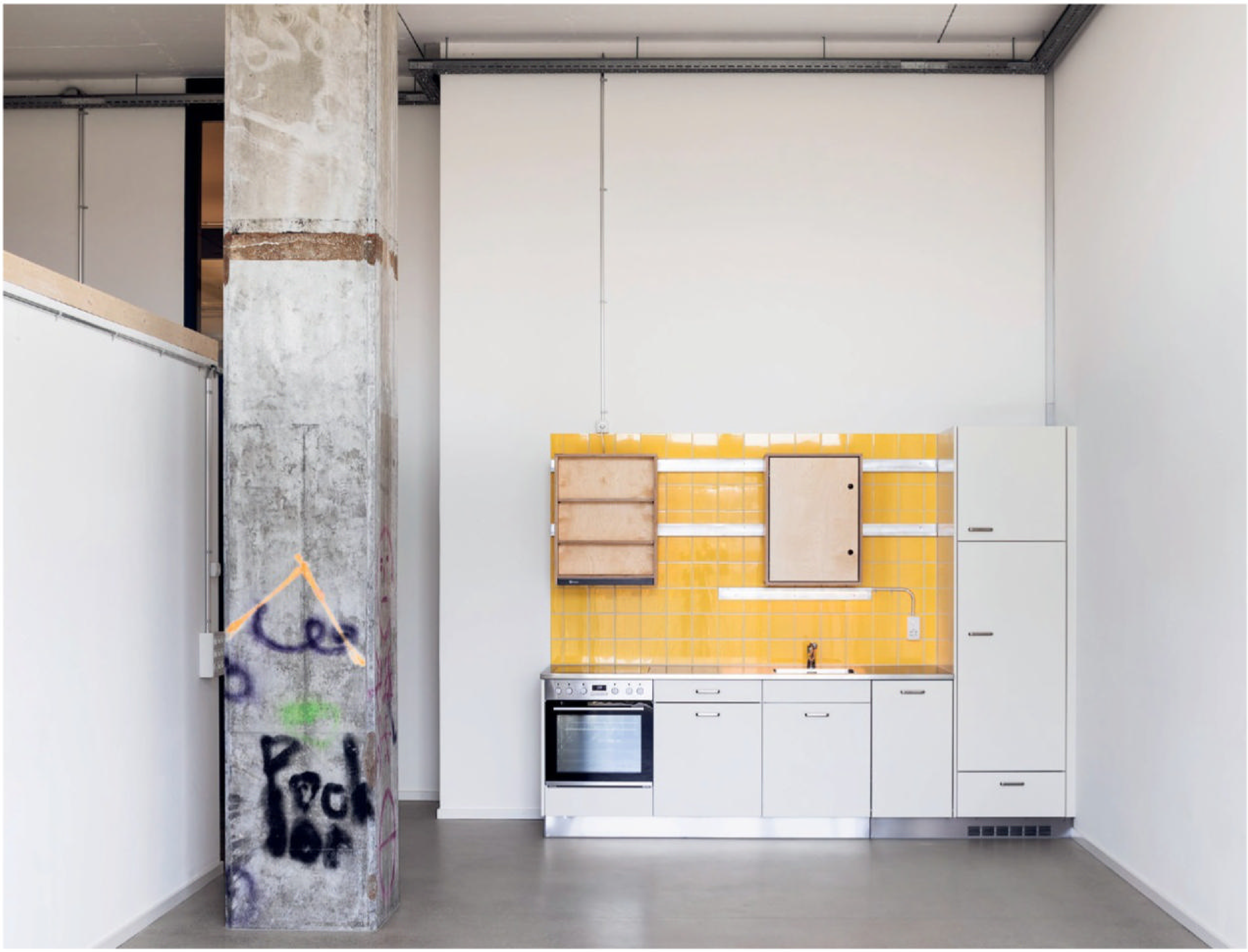

Jürgen Beck

STRIP & PROTECT

BHSF Architekten was tasked with finding a sustainable solution for transforming a warehouse in Bern into a living complex for 220 residents. The concept combined the conservation of resources, future achievement of energy goals and preservation of the Swiss city's industrial heritage. New and existing elements – even old graffiti – are in spatial dialogue throughout the building, including the private apartments.

COVERLAM
TECHNICAL STONE

OFFICE BUILDING MAGIC BOX, SPAIN / FAÇADE: COVERLAM BASIC BLANCO 1200×2600 mm / STUDIO: OMA Octavio Mestre Arquitectos / INTERIOR: Elastiko Architects / PHOTO: José Hevia

LARGE FORMAT
MINIMAL THICKNESS

Coverlam is a **technical stone** made from natural raw materials with **exceptional mechanical and aesthetic properties** that surpass those of any conventional tiling material. When used for **façades**, its large formats as well as the range of available sizes means installations can be completed in fewer steps and makes it adaptable to any project design requirements. Despite its reduced thickness, Coverlam is able to withstand the stresses to which **covering materials for ventilated facades** are typically subjected.

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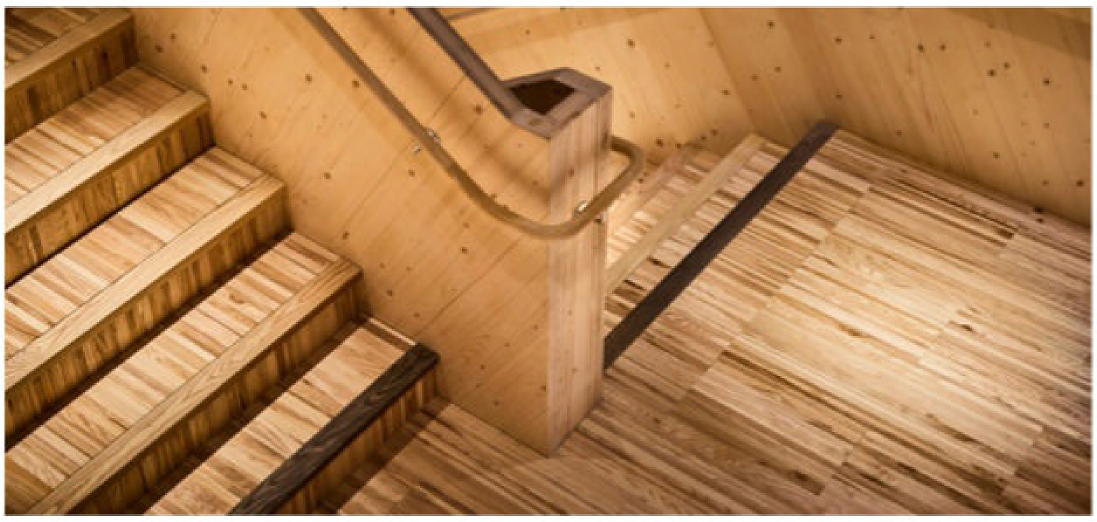
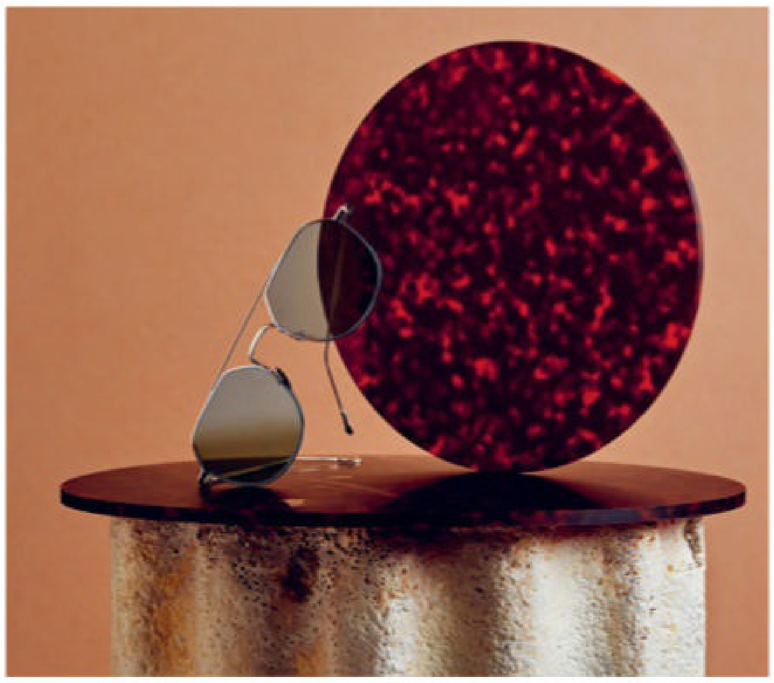


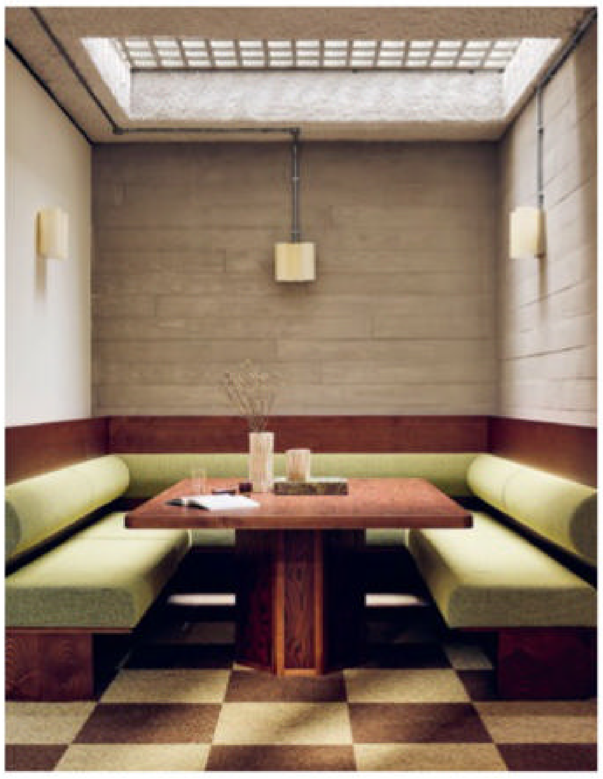
Måns Berg, courtesy of White Arkitekter

Exploring the possibilities of BIO MATERIALS – and why their future demands interdisciplinary collaboration. How designers can navigate the growth of – and bring nuance to – MASS-TIMBER ARCHITECTURE. What you need to know about B CORP certification. This issue's Insights break down three angles on SUSTAINABILITY.

Courtesy of Aléa



Kristy Noble, courtesy of Nina + Co



Jake Curtis, courtesy of TOG

Why BIOMATERIAL innovation requires a transdisciplinary approach

Jan Vranovský

In the future, we could coexist with the likes of living, sensing materials that naturally return to the earth. Designers will be key players in the network needed to get there.

Prevalent worked with biomaterial fabricators to design a sustainable space for Âpé Yakitori Bar in Australia.

From chairs grown from fungi to clothing fashioned from kombucha-SCOBY 'leather' to algae-based surfboards and skis – a biomaterial-fuelled future seems closer than ever. In the design world, most current use cases employ mycelium or bacterial cellulose. Biodegradable yet sturdy, mycelium has impressive sound- and thermal-insulation properties and shows potential for the likes of insulation panels and building blocks. Bacterial cellulose is strong and pliable, and could become a fitting alternative for soft materials like leather.

WHAT'S THE HOLDUP?

Although a lot of research and pilots are germinating, it may be a while before designers can nip to the local hardware store for a length of bioplastic or mycelium leather. This lack of easy access is just one of the current challenges that adopting biomaterials into the mainstream faces. 'Designers typically have to make their own biomaterial from scratch, creating a work-intensive phase before they can even begin the design phase,' says Julia Ihls, head of the HfG Karlsruhe Bio Design Lab. The challenges continue once the material is made, she says, as biomaterials, especially living ones, have a very different agency than that of traditional materials. 'A designer might have to start a material all over again if it didn't grow or became contaminated – in the real world, that might mean being unable to meet a customer's deadline.' And then there's upscaling. The HfG Karlsruhe Bio Design Lab can currently prototype single pieces, whereas mass production is difficult. That's because, says Ihls, 'industrial production processes have to adapt along with these materials'.

In other words, the field is nascent, as is our understanding of these organisms. 'If you look at fungi, we don't know 92 to 97 per cent of the species out there,' Ihls continues. 'There's also a lot to discover from a design perspective – maybe some species will provide other colour options or water repellence. All this unknown terrain makes it exciting *and* challenging for creatives, who aren't typically trained in natural sciences. We have to work transdisciplinarily, otherwise we can't solve these complex challenges.'

UNITE AND CONQUER

That's exactly what Romy Kaiser, Bea Delgado Corrales, Paula Nerlich and Anne-Sofie Belling – four PhD students at The Hub for Biotechnology in the Built Environment (HBBE), a joint initiative between Newcastle University and Northumbria University – are doing, combining their disciplines of design, technology and microbiology. Kaiser points out that biomaterials are currently used once harvested, or in other words, dead. 'What about exploring using them while they're alive? What about self-healing materials?' asks Delgado Corrales. 'The building and textiles industries are so unsustainable, and something needs to change. We can look to the basics – to biology – for potential answers. For these kinds of explorations, textile designers need to collaborate with microbiologists and molecular biologists.'

Delgado Corrales says that while biomaterials weren't made to be used as construction blocks, biotechnology can modify their capabilities, tailoring them to new applications. This is what the group is exploring in Human-Bacteria Interfaces (HBI) – part of the Driving the Human initiative – whereby materials can be used as sensors and grow by themselves into certain shapes. The team imagines a future where hybrid materials made of 3D-knitted textiles and genetically modified bacteria could turn interiors into living, evolving canvasses that can perceive and react to their surroundings. 'Mycelium bricks are usually piled atop one another – a very traditional building technique,' says Kaiser. 'But since we're working with grown – and growing – materials, why not use them to grow shapes directly?' A simple idea, perhaps, but one that comes with myriad challenges, including keeping the organisms alive through daily watering and the inability to halt the unwanted growth of large structures (smaller structures are often neutralized by baking them). Even if structures are completely air-dried, says Kaiser, they could theoretically thrive again when rewatered. 'This adds a new design element – the possibility of materials being active and dormant at various stages. It also raises questions: What does that mean for our health? What does the material emit, and how does that affect the surroundings? It's an interesting insight into how design methods need to adapt when you have living organisms with ongoing needs.'

Ihls poses similar questions: 'What happens if a biomaterial dissolves? Can that process be beautiful too?' She conjures the image of a costume design that interacts with an actor's sweat onstage, prompting the material to change – or even disappear. 'In that sense, biomaterials aren't just substitutions for other materials but offer new properties that can be worked into design concepts.'

DESIGNERS IN THE DRIVER'S SEAT

Impelled by the exciting possibilities of new materials and their potentially revolutionary properties, designers will not only be called on to develop scalable material solutions, but may need to lead the charge. 'The transition to biofabricated materials . . . hinges on designers who mediate between the demands of production, industry and the market, bringing their user-centred approach to material innovation,' writes FRAME's contributing sustainability editor Karianne Fogelberg. 'They can turn circular materials into desirable commodities and, with their imagination and capacity for storytelling, contribute to informing a new cultural understanding with the public.' **TI**

PRACTICAL PUBLICITY

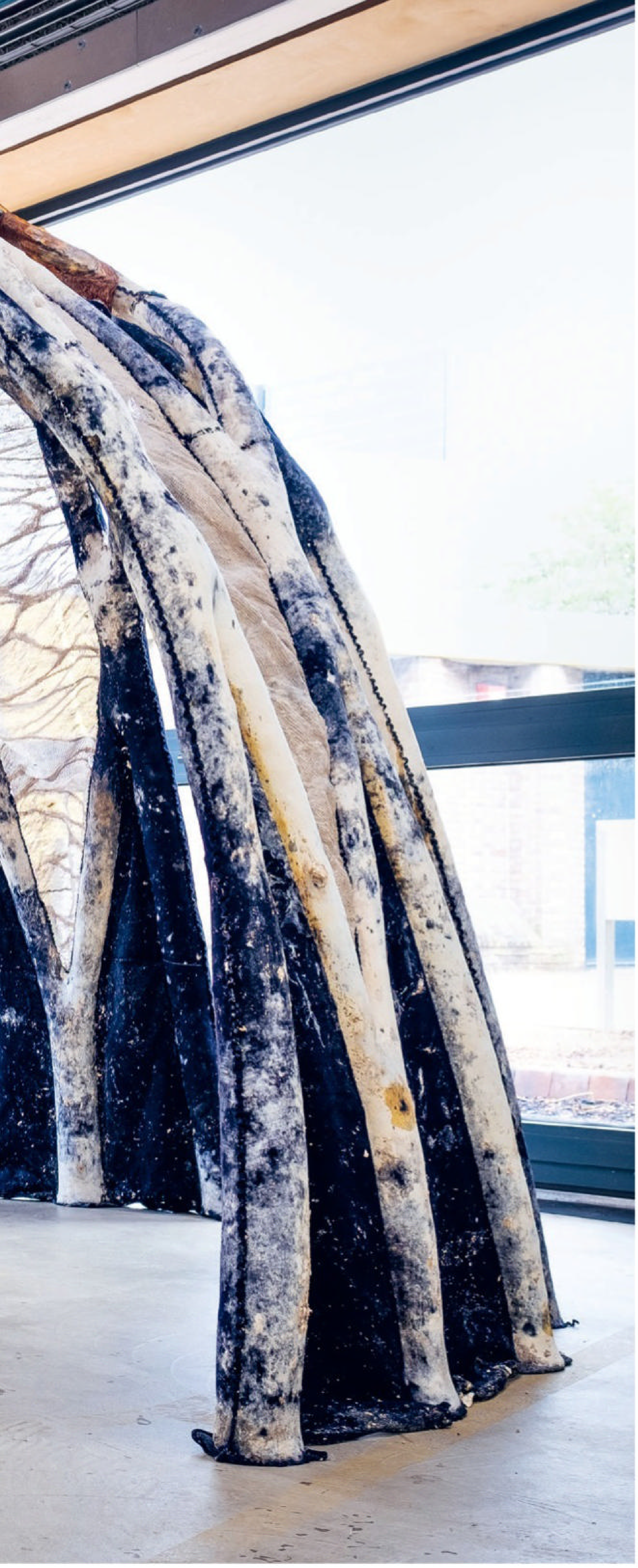
Given full control of the project budget for Âpé Yakitori Bar in Australia's Newcastle (also pictured on previous spread), Prevalent used the opportunity to make the restaurant a 'funding mechanism' for early-stage fabricators developing carbon-negative materials. Additions include mycelium acoustic panels by Mogu, a leather-like bench and branding assets crafted from Piñatex cellulose fibre, rubberwood furniture, and surfaces comprising a dust byproduct from stone-cutting. The goal is to grow wider awareness of the importance of carbon-neutral material sourcing.

Handover Agency

Kristy Noble

BRAND ALIGNMENT

Cornflour foam and mycelium plinths are among the materials used in Monc's first brick-and-mortar store, a Nina + Co design in London's Marylebone district. Combined with the likes of locally salvaged concrete, and recycled aluminium and plastic, these biomaterials align with the eyewear brand's strategy of creating a closed-loop system. Corrugated panels of cornflour foam form the ceiling installation and eyewear display shelves, and can be dissolved in water at the end of their lifespan.



Courtesy of HBBE

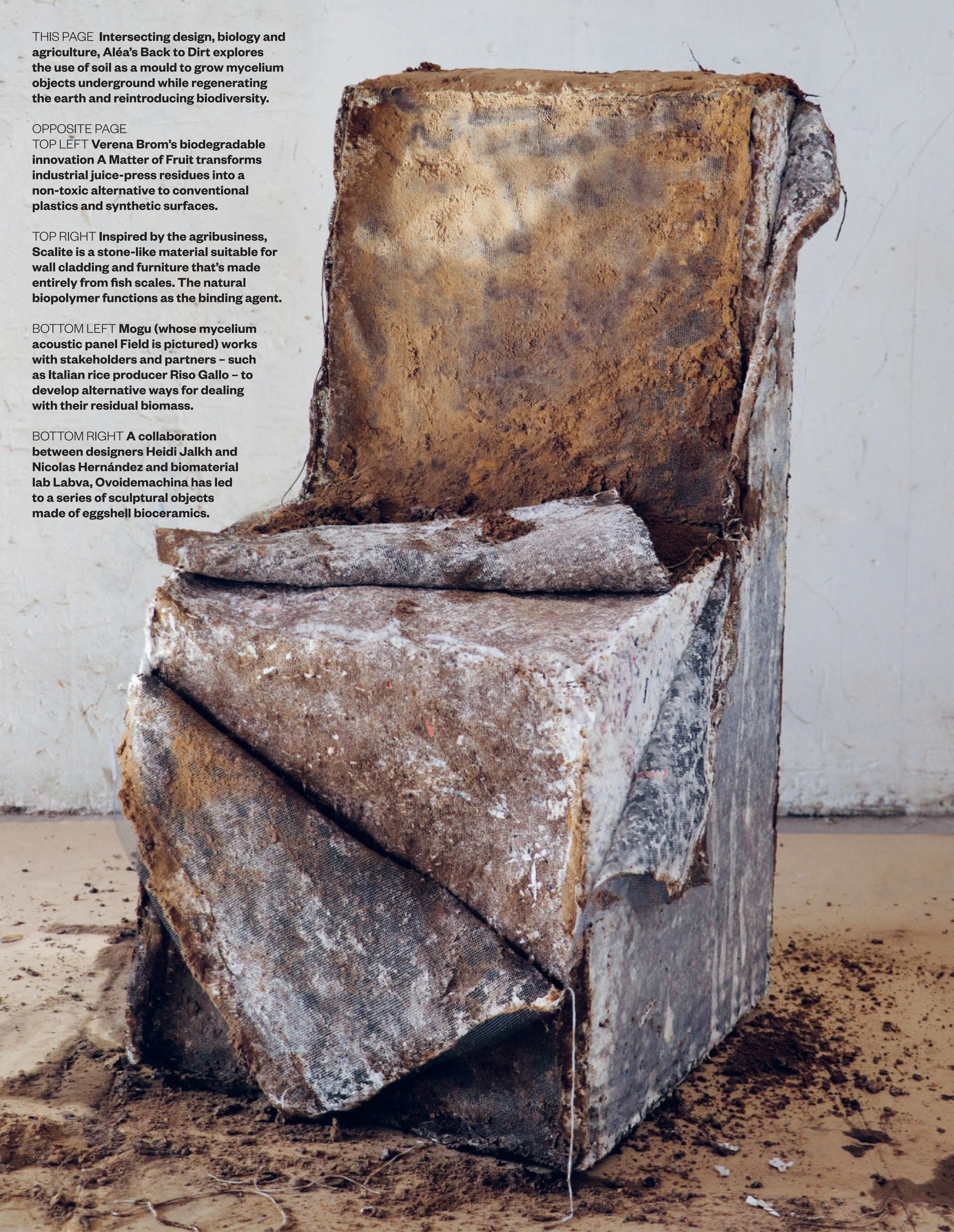
GROW-YOUR-OWN ARCHITECTURE

Combining biotechnology, digital fabrication and computation, The Hub for Biotechnology in the Built Environment (HBBE) created BioKnit, a prototype that uses growth as a construction process. The installation saw 3D-knitted textile become scaffolding to guide the growth of mycelium in an unsterile environment into a complex, self-supporting structure. The structure also provided the framework for long bacterial cellulose panels pre-grown into predetermined shapes. HBBE created an even bigger structure for More with Less, the inaugural exhibition at Newcastle's Farrell Centre that runs until September 2023. The fabrication technique was developed further and adapted to make use of local materials and waste streams.

David Duchon-Doris

DRIVEN BY DESIGN

Designers play a key role in encouraging the adoption of biomaterials. Rather than trying to mimic what already exists, they should delve into new aesthetic terrain. According to Maurizio Montalti, designer and founder of biotech company Mogu, adopters will need to be drawn to the beauty of these materials, not only to their sustainable and technical qualities.



THIS PAGE **Intersecting design, biology and agriculture, Aléa's Back to Dirt explores the use of soil as a mould to grow mycelium objects underground while regenerating the earth and reintroducing biodiversity.**

OPPOSITE PAGE
TOP LEFT **Verena Brom's biodegradable innovation A Matter of Fruit transforms industrial juice-press residues into a non-toxic alternative to conventional plastics and synthetic surfaces.**

TOP RIGHT **Inspired by the agribusiness, Scalite is a stone-like material suitable for wall cladding and furniture that's made entirely from fish scales. The natural biopolymer functions as the binding agent.**

BOTTOM LEFT **Mogu (whose mycelium acoustic panel Field is pictured) works with stakeholders and partners – such as Italian rice producer Riso Gallo – to develop alternative ways for dealing with their residual biomass.**

BOTTOM RIGHT **A collaboration between designers Heidi Jalkh and Nicolas Hernández and biomaterial lab Labva, Ovoidemachina has led to a series of sculptural objects made of eggshell bioceramics.**

THIS TRANSPARENCY BAR SHOWCASES THE JOURNEY OF OUR MATERIALS FROM THE GROUND UP. EACH MATERIAL IN THIS MULTI-LEVEL GLASS TABLE IS DELIVERED BY NATURE AND POWERED BY SCIENCE TO CREATE ESSENTIAL PRODUCTS WITH INNOVATIVE TECHNOLOGY. WE BELIEVE IN TRANSPARENCY—FROM MATERIALS USED TO SUPPLY CHAIN—AND WE ARE ON A MISSION TO CREATE AN EARTH-POSITIVE FUTURE THAT GIVES BACK TO THE PLANET.

Valentin Fougeray

What the B CORP buzz is all about

At Pangaia in Paris, B Corp-certified Random Studio included a circular material made from compressed recycled textile fabric.

Although the numbers are still small, the design industry is slowly waking up to the idea of getting B Corp certified, making social and environmental impact as important as profit. What does the certification entail and what does it mean for business?

Despite receiving its share of criticism – some certified companies believe the programme's integrity was put at risk by certifying Nestlé-owned Nespresso despite allegations of child labour on its coffee farms, for instance – B Corp certification is rapidly growing across sectors, sizes and locations. In the past year alone, the European community grew 64 per cent, to 2,000 companies. But a search for 'design studio' on the official website yields just 110 hits, a remarkably low result for an industry that constantly talks about sustainability, wellbeing and community. So why should companies bother to get B Corp certified and what does it take to get there?

MATCHING TODAY'S DESIGN DEMANDS

B Lab, the US-born non-profit organization behind the label, speaks about a 'movement' of people going beyond business as usual by putting social and environmental impact on par with profit. To get the certificate – which requires renewal every three years – businesses are graded in five key areas: governance, workers, environment, customers and community.

Currently, becoming certified is arguably the most comprehensive way for companies to demonstrate their values and beliefs to the world, according to Jan-Willem Poels, who recently resigned as Moooi USA's country manager to become a B Corp consultant. In the 20-plus years since starting his career, Poels has witnessed how the focus has shifted away from simply creating beautiful, useful objects. Today, he says, we need to start questioning the product's necessity and consider everything from how and with what it's made to its longevity and afterlife. 'In short, we need a more holistic approach to product design.' There's still work to be done – 'furniture' results in only 84 hits on the B Corp site.

A small but rising number of interior design studios share this vision. In 2018, after realizing how much waste it generated with its installations and online productions, Amsterdam-based experience design agency Random Studio began planting trees to compensate for its carbon emissions. 'Until recently, this is what being sustainable looked like to us,' says communications manager Debbie Schonenberg. Following the pandemic, the studio sought to 'create a new standard to which we can hold ourselves accountable and to implement sustainability within our company's best practices', and thus became B Corp certified in July 2022.

MORE THAN SUSTAINABILITY

Retail design practice StudioXAG (certified since August 2022) appreciated the certification's wider lens. Daniel Wigham, senior strategist at the London- and Amsterdam-based studio, shares: 'We felt that B Corp could help guide us through other missions, such as becoming more community-centric and having more transparent governance.'

According to Poels, B Corp can also help to recruit top talent. 'The younger generation is eager to work for companies that want to make a positive impact on the world and that are committed to continuous improvement,' he says. What's more, an increasing number of potential clients are seeking out companies that actively work towards a better future. The B Corp logo is a signifier of this goal. Random's Schonenberg confirms: 'We're now approached for projects that specifically have a sustainable element. It's becoming more of an industry standard, and we want to play a role in normalizing a sustainable way of working.'

NO WALK IN THE PARK

Schonenberg calls the process – which for Random lasted from late 2020 until summer 2022 – 'rigorous' and 'daunting'. 'It's an official, long-term commitment that's about cultivating a state of mind, shaped by a long and detailed assessment process. It requires you to take a hard look at how your business runs, put changes in place and provide evidence in order to become certified.' Over at retail design practice StudioXAG, two staff members finished the 'challenging' journey within two years. 'Don't expect to become a B Corp tomorrow,' says Wigham.

And the work doesn't stop once the certificate is in the pocket. Companies must demonstrate progress through re-certification and be transparent about their business practices. The B Corp standards also evolve, becoming more stringent and impactful with community input. For example: only recently has a strong emphasis on DEI (Diversity, Equity and Inclusion) become manifest.

IS IT ALL WORTH IT?

StudioXAG's Wigham speaks of a turning point for the studio. 'The certificate has given us a framework to live by. Our team now has more power to influence and own initiatives that impact our local community, like fundraising through events. It's also changed our approach to projects, giving us greater confidence in suggesting new ways of working with our clients and offering our expertise and credentials to reassess the sustainability of our projects.'

Random Studio's main takeaway is the importance of being more intentional. The studio is making further strides to become more sustainable and trying to work with like-minded partners, suppliers, materials and other B Corps. 'Hopefully,' says Schonenberg, 'that has a knock-on effect on clients to rethink their practices.' **RT**

PANGAIA
THIS SNEAKER IS MADE FROM GRAPE LEATHER
AND THE SOLE IS MADE FROM RECYCLED RUBBER.
IT IS CIRCULAR IN PRODUCTION AND DESIGN.

POST-PANDEMIC Reset

Following the Covid-19 pandemic, Amsterdam-based experience design agency Random Studio took its sustainability strategy beyond carbon offsetting, and became B Corp certified in July 2022. These ideals are materialized in its projects, such as Pangaia's first semi-permanent physical shop in Paris's Galeries Lafayette Champs-Élysées (also pictured on previous spread). Reflecting Pangaia's goal of becoming net-zero across its own operations by 2025, the modular interior can be easily replicated, scaled up or down, and modified to suit various locations and needs.

LEARNING ALONG THE WAY

In 2020, eyewear brand Ace & Tate (B Corp certified since September 2021) introduced its Responsible Retail Design initiative. Flexible, modular store fitouts ensured the brand could adapt to different locations and requirements. In late 2021, the company shared that it ‘f*cked up’, stating that the initiative’s insignificant reduction in environmental impact wasn’t worth the loss of brand identity and creativity. Now, instead of ‘focusing on design-based interior solutions such as store fittings and furniture’, the strategy ‘will focus on real impact drivers. Structural changes such as electricity, the infrastructure of the building and how we use water will create the most impact, and they won’t make us compromise on our identity either.’

Hallo, wir sind Ace & Tate und
verkaufen Brillen. Aber das ist
nicht alles ...
Verändern wir mit unserer Arbe
Welt? Wahrscheinlich nicht.
Allerdings hoffen wir, deine Si
die Welt ein wenig zu veränder
und wir tun unser Bestes, dab
den Planeten zu zerstören.
Mutige Ansichten
Verantwortungsvolles Handeln
großartige Brillen. Das ist uns
und das motiviert uns. Wir mö
dir neue Sichtweisen eröffnen
nur in Form einer neuen Brille),
wir eine Community an kreativ
Menschen schaffen, die etwas
bewegen. Wenn wir uns gege
inspirieren, ist das Leben einfa
schöner.
Findest du gut?
Dann schau genauer hin.

Ace & Tate’s Zurich branch was designed in 2022 by Studio Feixen.

Holla
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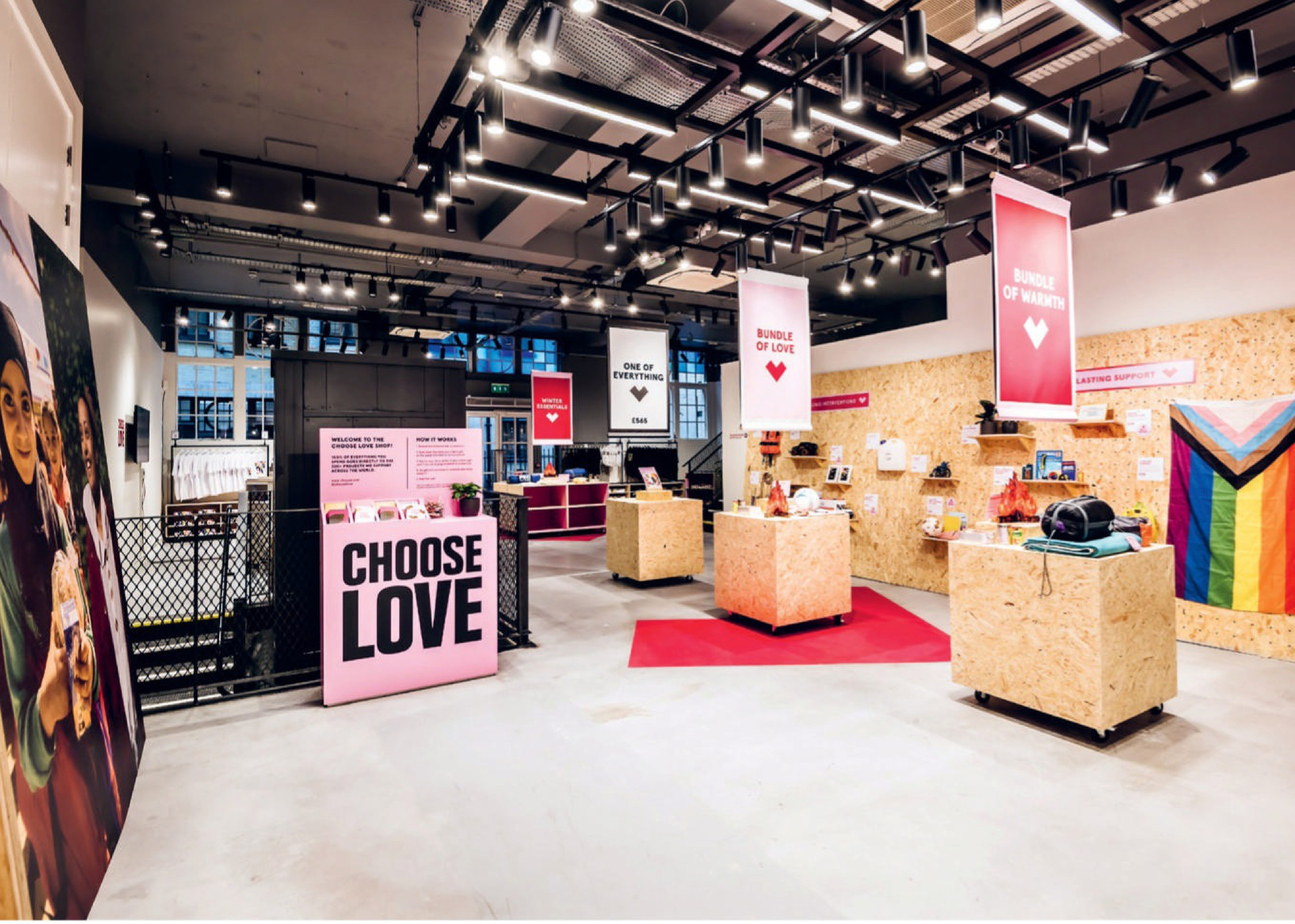
CHOOSE LOVE
BUY GIFTS THAT CHANGE PEOPLE'S LIVES
CHOOSE LOVE

Alex Kurunis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LASTING SUPPORT

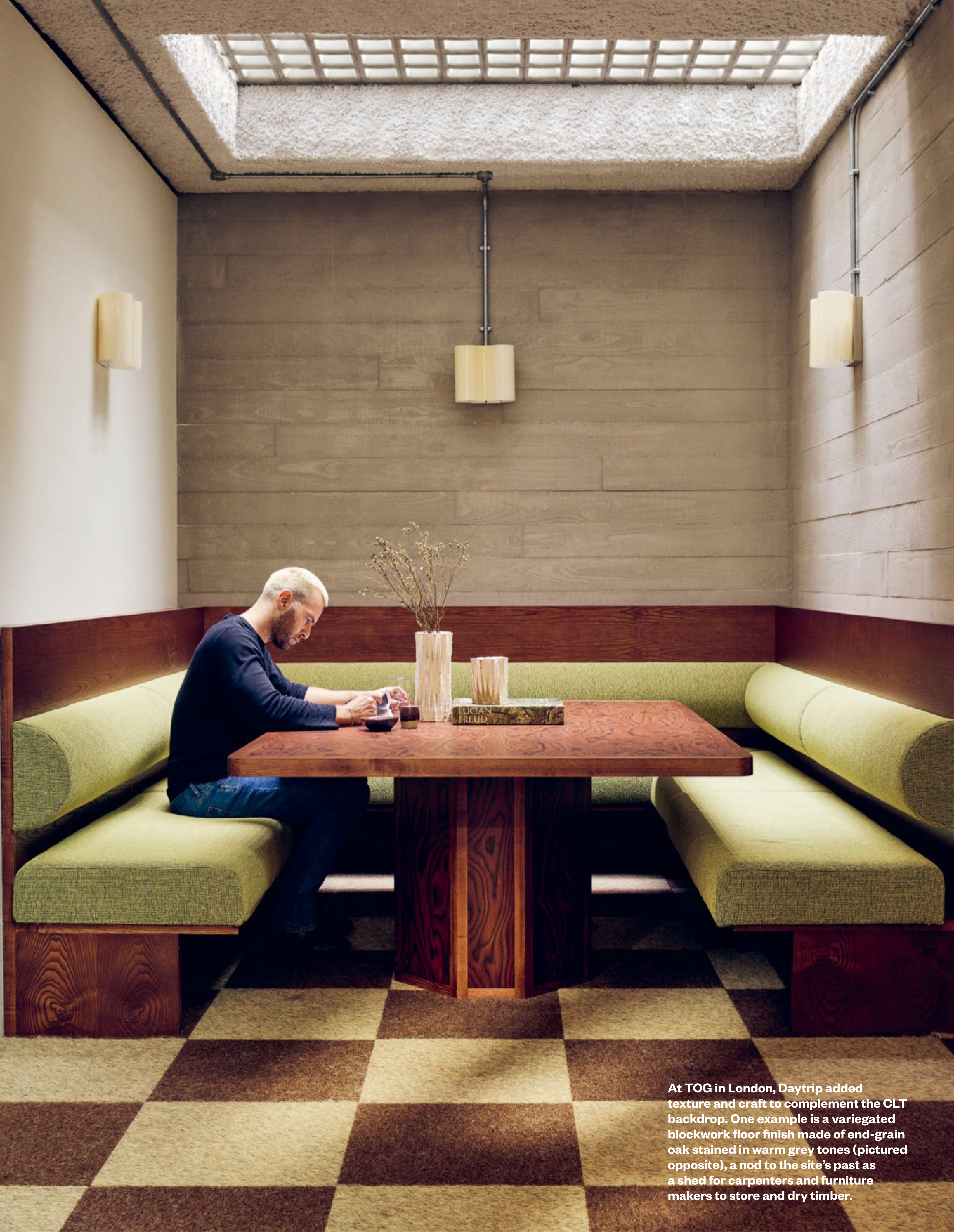
NEW APPROACH TO PROJECTS

B Corp certification has changed retail design practice StudioXAG's approach to projects. Senior strategist Daniel Wigham says it's given the team 'greater confidence in suggesting new ways of working with our clients and offering our expertise and credentials to reassess the sustainability of our projects'. StudioXAG's physical space for humanitarian organization Choose Love in London, for example, reflects its intention to use its business as a force for good.

Jake Curtis

What MASS-TIMBER buildings mean for interior design

If wooden buildings continue to sprout up across the globe, with their columns, wall surfaces and ceilings of wood, how can designers differentiate their interiors?



At TOG in London, Daytrip added texture and craft to complement the CLT backdrop. One example is a variegated blockwork floor finish made of end-grain oak stained in warm grey tones (pictured opposite), a nod to the site's past as a shed for carpenters and furniture makers to store and dry timber.

The sustainability claims attached to mass-timber buildings are pushing wooden architecture into the spotlight. Take, for instance, TOG's new Waugh Thistleton Architects-designed Black & White Building in London. Thanks to the use of CLT (cross-laminated timber) as the principal material, it reportedly has 37 per cent less embodied carbon than comparable structures in concrete. What's more, it can be dismantled and reused in the future. And this is not a one-off tale. Another side effect of the use of mass timber is that it can result in surfaces too beautiful to hide. But is this a boon or a burden?

DO MASS-TIMBER INTERIORS DEMAND A DIFFERENT APPROACH?

Well, yes and no. Since interior designers are used to working in dialogue with the architecture at hand, mass-timber buildings simply offer another 'site condition' to respond to. As Matilda Åhsberger – an interior architect at Scandinavian practice White Arkitekter, which has worked with CLT for the likes of Magasin X and the Sara Cultural Centre and The Wood Hotel – says: 'When we work with interior design, we always start from the conditions, character and strengths of the place. We did the same with Magasin X.'

But mass-timber buildings do offer *different* site conditions. Daytrip contributed the interiors to TOG's Black & White Building, which features a CLT frame, glulam curtain walling, and laminated veneer lumber (LVL) columns and beams. Aesthetically speaking, that means that 'instead of the usual industrial mix of reinforced concrete, breezeblock and steel,' says Daytrip's Emily Potter, 'the shell is beautifully crisp and clean in a knotty blonde timber.' In other words, mass-timber buildings can make additional finishes unnecessary, which is both a benefit and a challenge.

One advantage is inherent warmth and materiality – something designers typically have to apply on top of base materials like concrete and white plaster. White Arkitekter, for instance, often has to *add* materials like wood to create the inviting, warm feeling desired by its clients. What's more, says Åhsberger, CLT buildings offer a different sound environment than those with a concrete frame. 'They have a positive effect on acoustics and footfall noise. And they also smell good.'

As for the challenges, one is that working with exposed surfaces means there's nowhere to hide anything, whereas traditional wood framing leaves a wall cavity for concealing electrical and plumbing services. Architect Jennifer Bonner, MALL founder and co-author of *Blank: Speculations on CLT*, offers three options for electrical wiring. One: directly rout into the wood panel from the interior side and cover with another material, as she and her team did at Haus Gables; two: install electrical runs on the exterior of a panel in the wall assembly; or three: use a surface-mounted conduit on the interior side of a panel. 'Basically,' says Bonner, 'there's a lot to coordinate with CLT construction. But it's also exciting because you can pre-plan and have everything pre-cut into your panels by the manufacturer.'

IS A UNIVERSAL SURFACE A BAD THING?

If the CLT movement spreads far and wide, would all interiors eventually look the same? And if so, would that be a bad thing? After all, wooden interiors are biophilic by nature, and are strongly linked to well-being. 'In the US we primarily live in drywall [plasterboard], white interiors,' says Bonner. 'I think it's exciting if we shift to wood interiors. Natural, porous, graphic, instead of the abstraction of drywall. Yes, it's a totalizing aesthetic, but I would encourage designers to think about how to combine CLT with other materials, as we did for Haus Gables.' White's Åhsberger agrees: 'Hopefully the wood wall with all its qualities will become just as common as the plaster wall.'

UNIVERSALITY DOESN'T MEAN UNIFORMITY

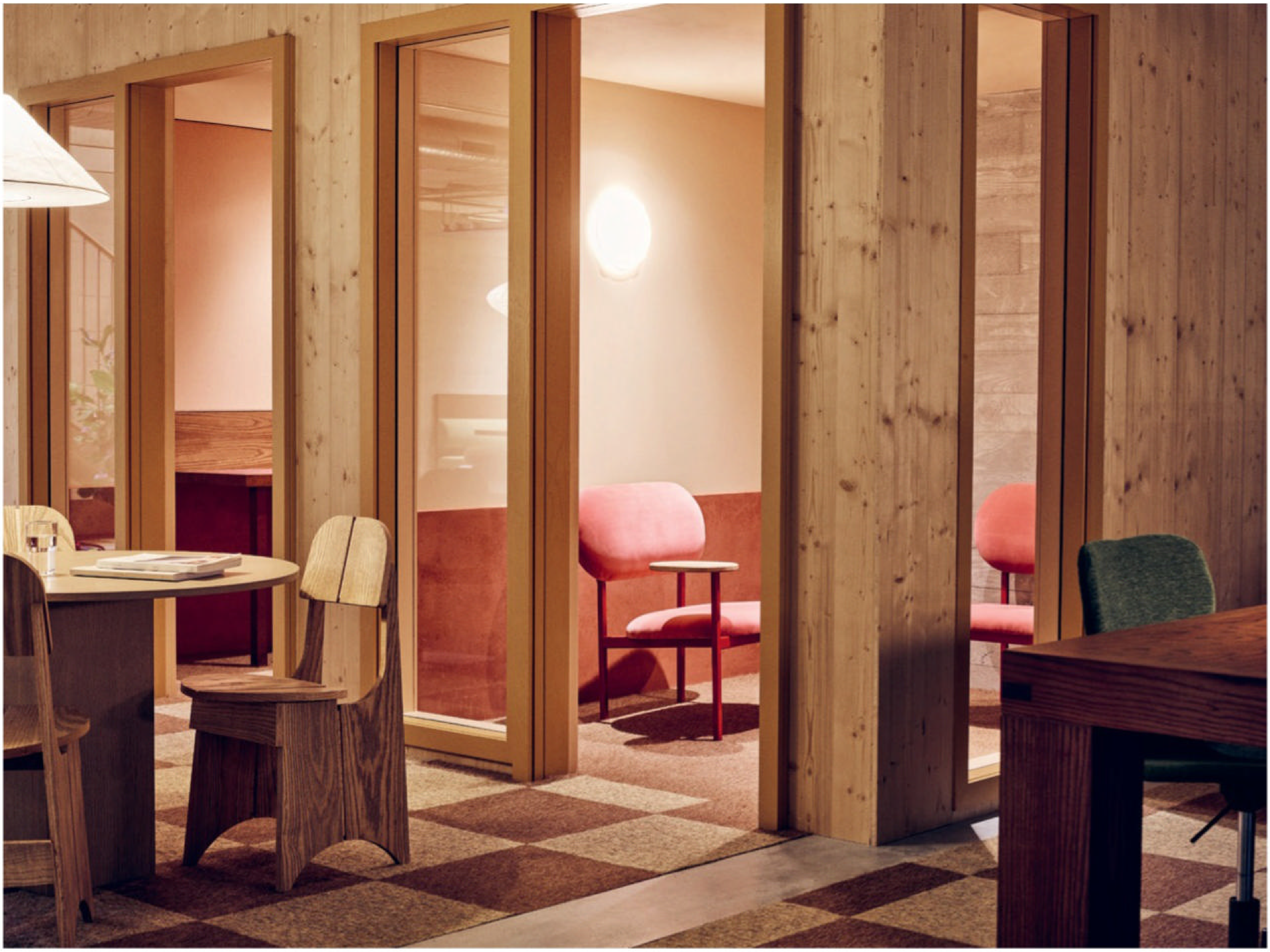
And even if wooden interiors become commonplace, there's so much potential for differentiation. Daytrip's Iwan Halstead believes that 'as the typology evolves, the interiors will follow suit. There's scope to apply finishes, panels or works of art to the CLT construction.' Could he imagine painting CLT? 'Possibly. I can see how stains or certain paint treatments would transform the architecture. I'm imagining a future where interior designers experiment and test surface finishes – it could be amazing with a layer of clear tinted gloss, for instance.'

Alongside different paint treatments that interact with CLT in various ways, White's Åhsberger sees potential for altering the look and feel of the surface via such relatively unexplored methods as clay plaster. 'We will continue to explore the relationship with the wood surface, and it will be exciting to see what comes next. Another aspect is to see how the wood will age and how its character will change over time.'

What's more, not all wood is created equal, and the type of timber used completely changes the palette. Daytrip's Potter points to Dutch architect Boris Zeisser, for example. 'He uses CLT made of iroko, and the result is extraordinarily rich and entirely different.' While Bonner thinks it's hard to shake the imagery of mass timber's Scandinavian vibe, it's not impossible. 'I did so at Haus Gables by adding other flat, graphic materials. You can also carve and engrave into CLT with a CNC machine at the manufacturer. You can cut any shape out of the panel – I'm cutting out large scallops for my Blank House project in Portland. The possibilities are endless.' **TI**

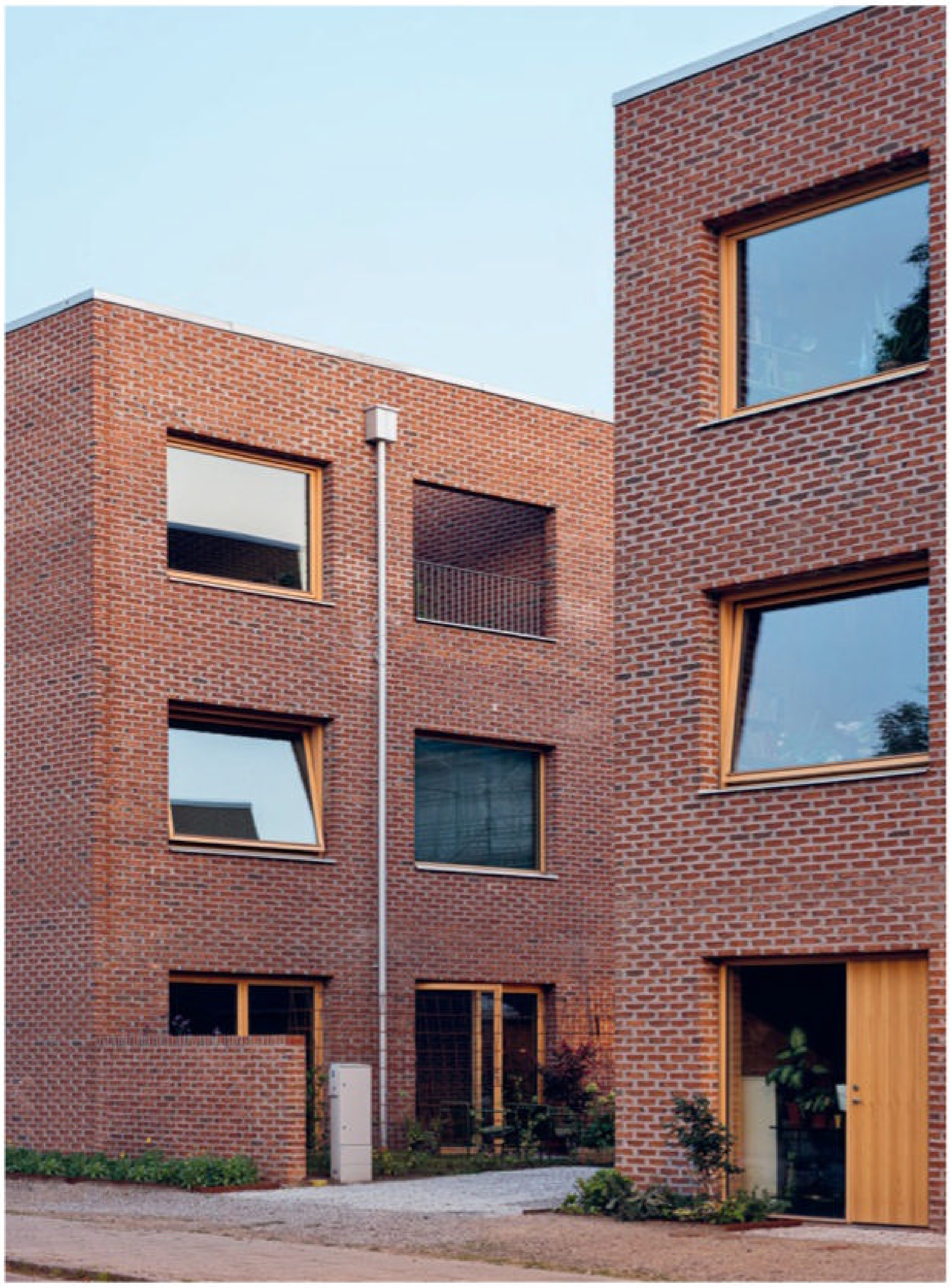
BUILDING ON A BACKDROP

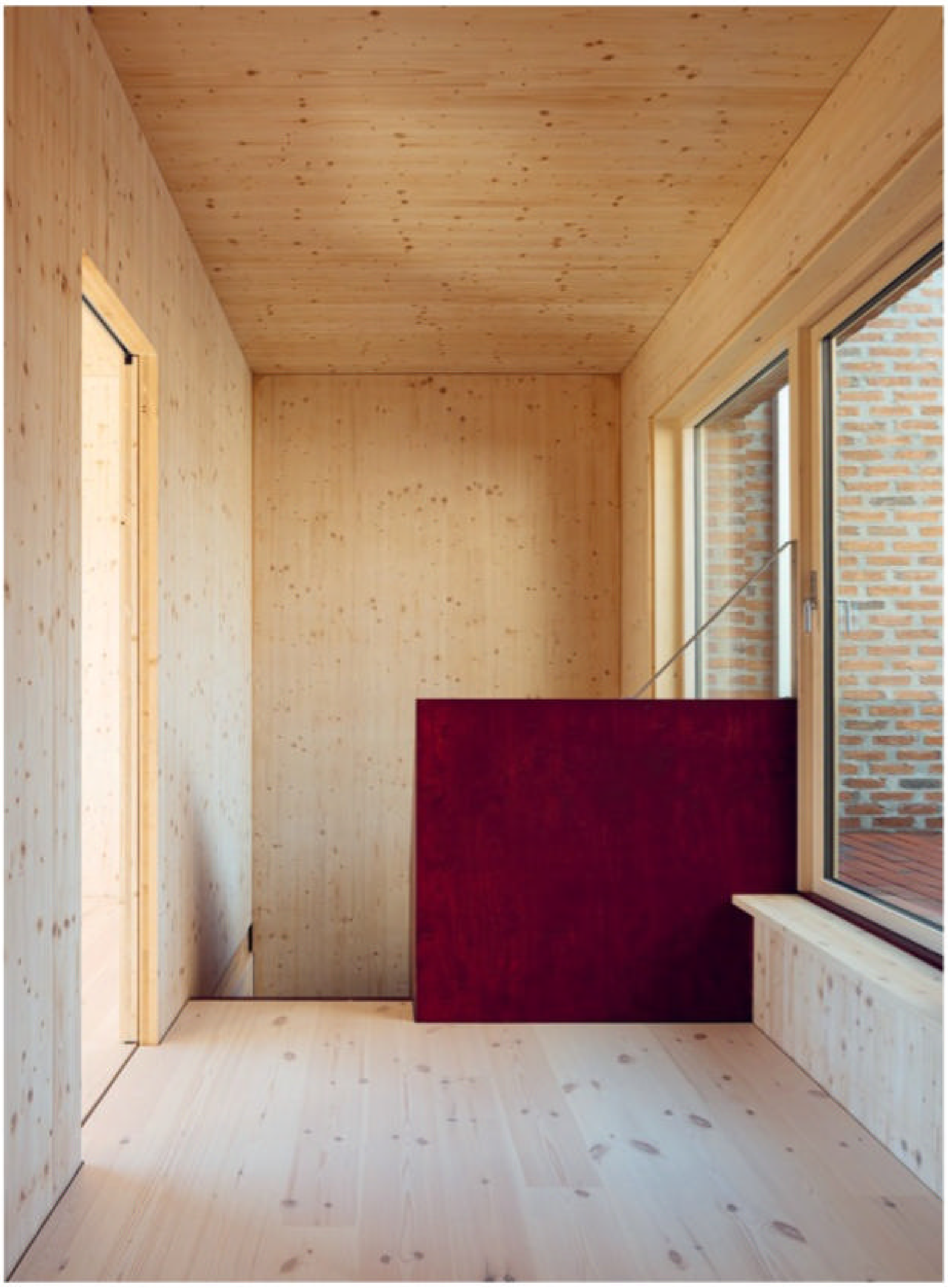
Daytrip contributed the interiors to TOG's Waugh Thistleton Architects-designed Black & White Building in London (also pictured on previous spread), which features a CLT frame, glulam curtain walling, and laminated veneer lumber (LVL) columns and beams. The designers decided to celebrate wood's natural qualities and inherent versatility by adding further timber varieties.



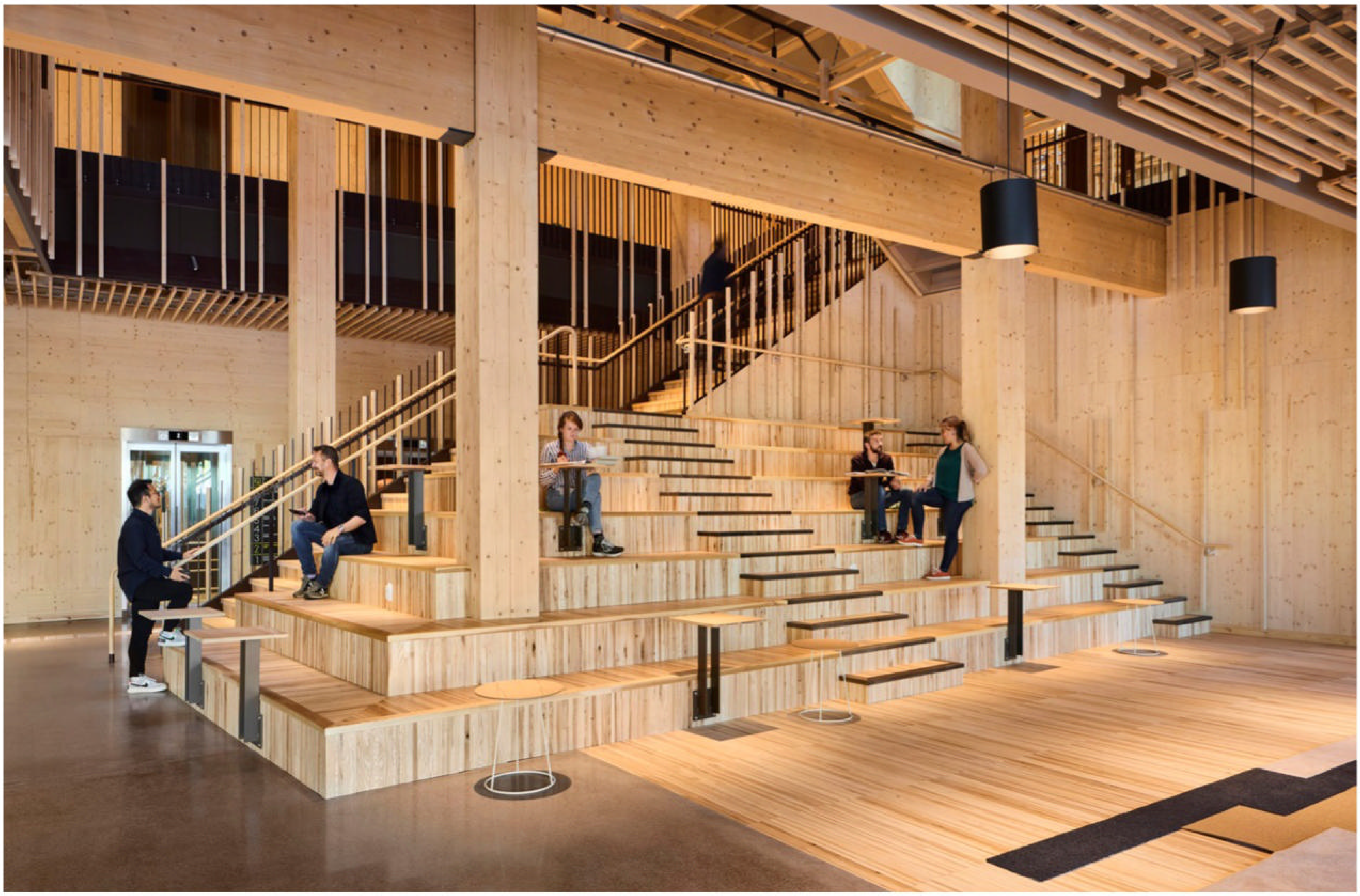
TEXTURAL VARIETY

At Twelve Houses – a block of townhouses in Sorgenfri, the oldest industrial area in Malmö, Sweden – red-brick façades cover a CLT structure that's left exposed indoors. Reinforcing the wealth of wood, Förstberg Ling – the project's architect, developer and main contractor – added plywood panels, with a pattern in distinct yet subtle contrast to the CLT. The studio worked to avoid an 'all-CLT interior' by introducing a select palette of other materials as a counterpoint to the sweeping wooden surfaces. Clay blocks surround the bathrooms, for example, adding textural variety.





Markus Linderoth

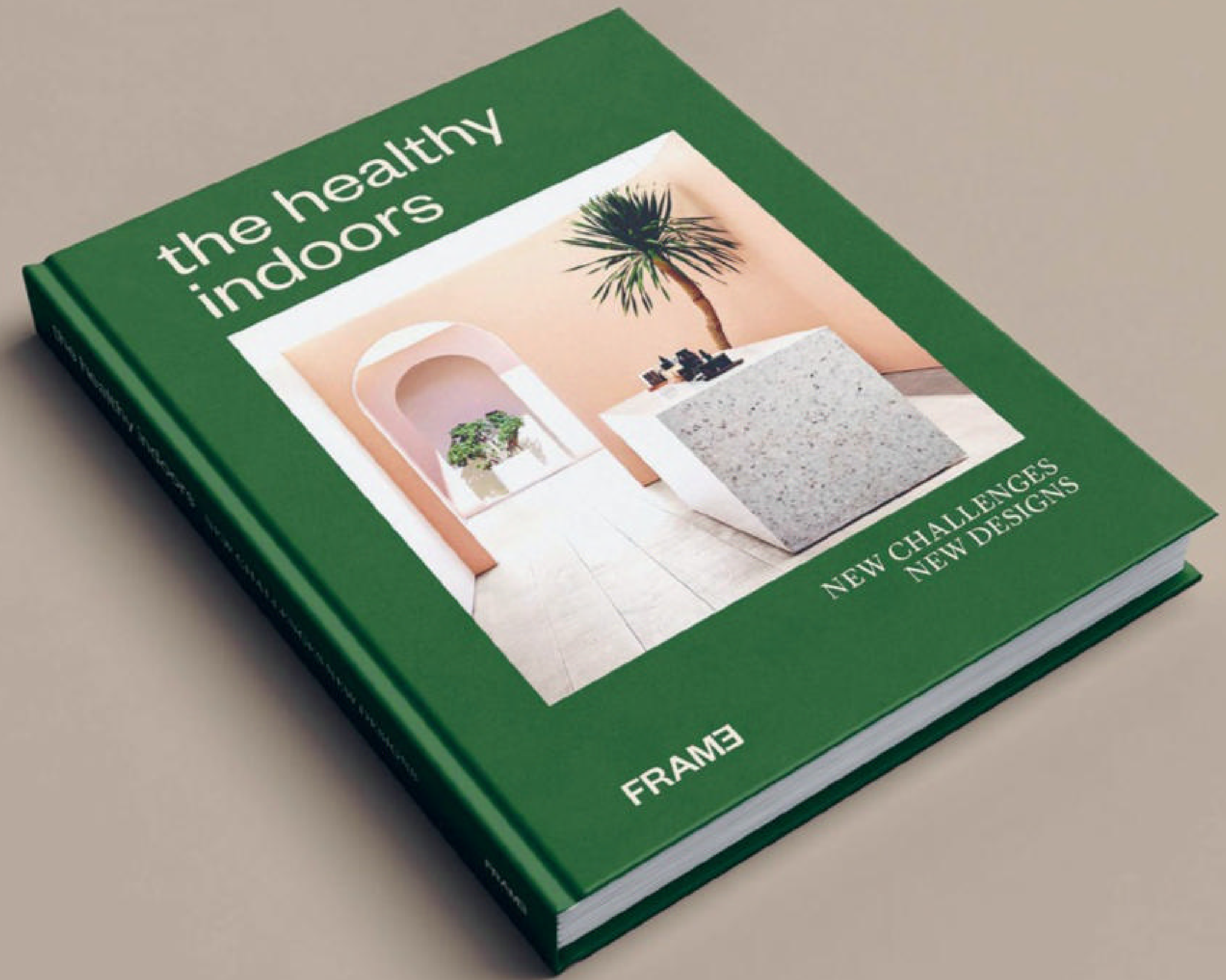


Måns Berg

EMBEDDED WARMTH

Located in Uppsala, 16,000-m^2 Magasin X is Sweden's largest office building with a completely wooden structure. Real estate developer Vasakronan commissioned the project to White Arkitekter, whose local outpost is now among the building's tenants. White's Matilda Åhsberger says that because Magasin X has so much exposed wood in the façade walls and the wood construction is visible, the interior already has warmth and materiality – something the designers typically have to add in concrete-frame buildings with white plaster walls.

A FRAME-CURATED SERIES


the healthy indoors
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The Healthy Indoors candidly addresses the increasing need for spaces designed to serve multiple and diverse uses while promoting a culture of wellbeing and innovation. Laying claim to significance beyond that of aesthetics, the case studies selected for this book are thoroughly presented in a way that will appeal to both professionals and enthusiasts alike. **€49**

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WHERE WE LEARN
Reimagining Educational Spaces

Where We Learn investigates how learning spaces are evolving to be made more engaging, flexible and all-around better suited to today's challenges and opportunities. Geared towards readers interested in understanding the broader impact of design on the human experience, this book highlights imaginative projects while remaining grounded in practical contexts and real-world settings. **€49**

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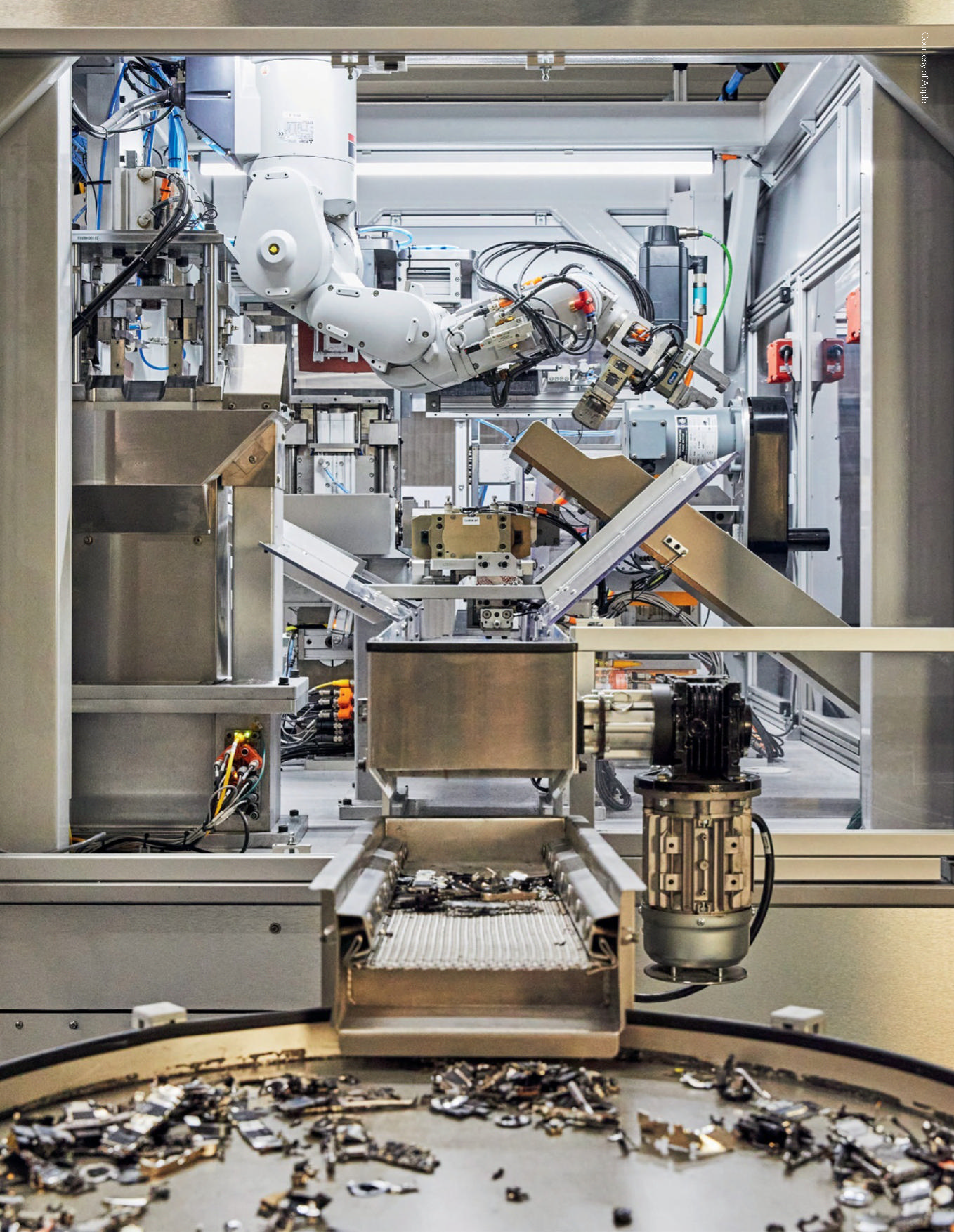
IN THE LOOP

Johnny Kangasniemi

113

Courtesy of Lucas Muñoz Muñoz



Courtesy of Apple

PREVIOUS SPREAD LEFT **Filippa K teamed up with Swedish designer Stina Randestad to create a collection of six bespoke garments constructed entirely from second-hand Filippa K materials. A series of down puffer jackets in water-repellent polyamide, for example, were layered and trimmed with blue and orange satin-wrapped cotton rope to produce a statement garment.**

PREVIOUS SPREAD RIGHT **The installation-cum-sound system Lucas Muñoz Muñoz designed for ON Running's flagship store in Zurich takes its shape from a rock volume referencing the brand's roots in the Swiss Alps. Made of recycled, repurposed and recyclable materials, the sculpture features a textile skin fabricated from 50 kg of leftover shoe prototype material and discarded finished shoe samples.**

OPPOSITE **Addressing the importance of electronics salvaging, Apple's patented iPhone disassembly robot Daisy can now take apart 23 models of the iPhone, reclaiming valuable materials stored inside and sorting components for recycling.**

RIGHT **The Nike ISPA MindBody is designed with the product's end of life in mind. Eliminating the need for glue and making them easy to disassemble, a single cording system holds all the sneaker's interlocking components together. When consumers are ready to discard their pair, they can drop them off at a participating Nike store for donation or recycling.**

Courtesy of Nike

From fashion and food to electronics and art, numerous industries are making strides to adapt to a new global consciousness. In this issue's Mood Board, we roam the creative sector to take a closer look at sustainability initiatives across disciplines. **FK**

Christian Kerber

Nicolas Hübner

ABOVE **Studio.Malu harvests the filamentous algae Cladophora – growing in abundance because of human activity – from Berlin lakes to produce textiles. Thanks to its different qualities, the algae can be processed into translucent non-woven fabric, spun like a yarn or turned into a biodegradable bioplastic with the potential to replace PVC used in raincoats and bags.**

RIGHT **With the speculative project Landless Food, Studio.Malu anticipates a loss of agro-biodiversity and explores how the tastes of microalgae can be altered by manipulating their metabolism.**

OPPOSITE **Commissioned to develop a piece for Habitat One, an exhibition exploring sustainable housing solutions for a carbon-neutral society that was held at the Hyundai Motorstudio in Busan, South Korea, EcoLogicStudio conceived a 10-m-tall living sculpture. Designed by artificial intelligence and biodigitally grown, Three One remetabolizes and stores carbon molecules in its trunk and canopy, and releases oxygen into the atmosphere.**

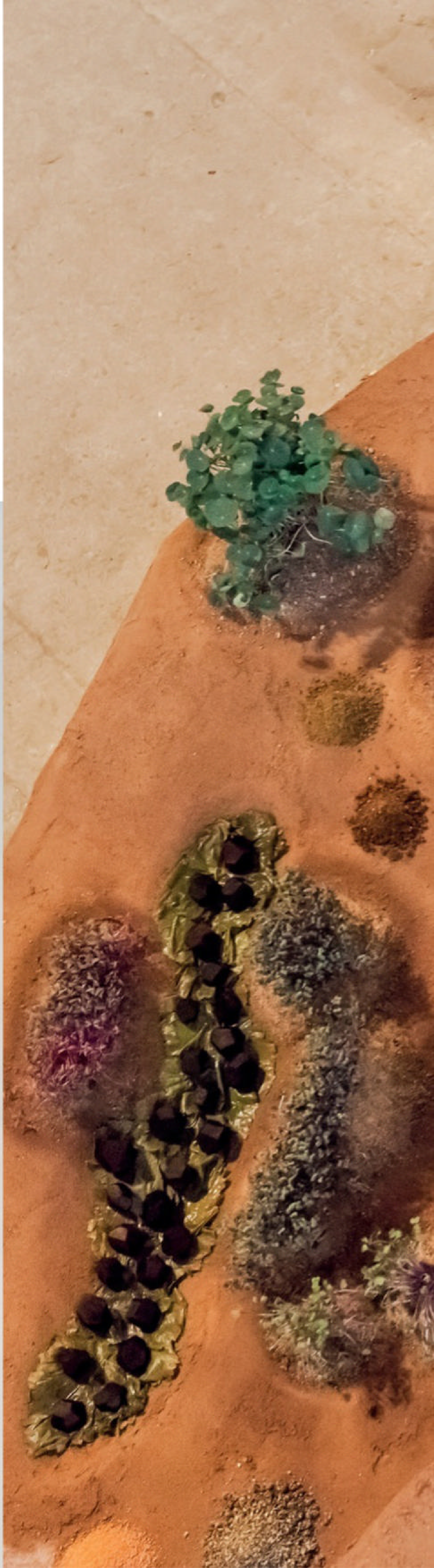
Paul Cochrane

Yoon Joonhwan

BELOW **With a background in chemistry and biomolecular science, Jesse Adler set out to extract pigments from fungi to explore how they can function as abundant renewable sources of colour, ultimately eliminating the need for fossil-fuel-based synthetic dyes. Showcasing the potential of fungal pigments, Adler developed a makeup collection with extracts from mushrooms, lichens, yeast and mould.**

RIGHT **The edible table landscape Terra Firma by Heiter X, an Estonian food and design experience, aims to encourage mindful eating and spark conversations about what and how we eat, and how we can incorporate food production and waste into our daily lives.**

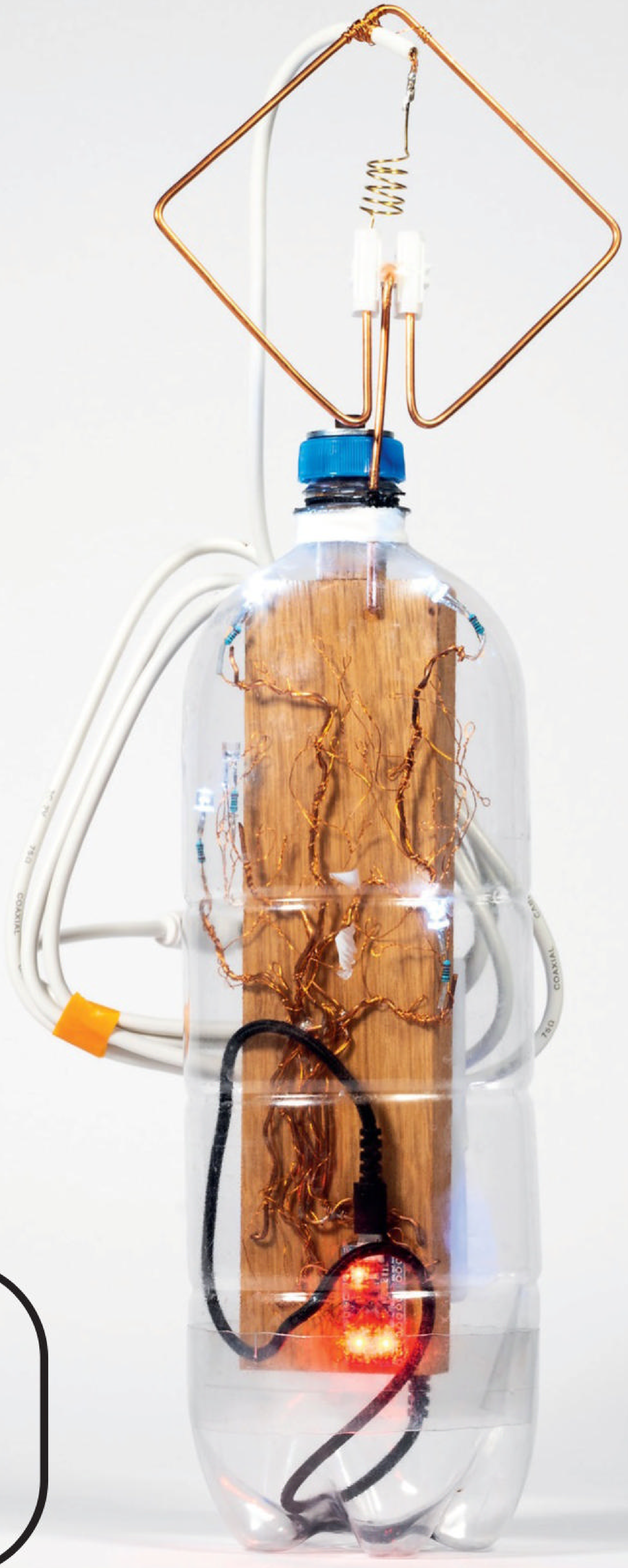
Tom Mannion



Tomek Dersu Aaron Whitfield

Alana Proosa

Envisioning a future in which mass production has been limited and reuse and repair flourish, Superflux conceived a series of speculative handmade artefacts that 'propose alternate, craft manifestations of technology, a move back into smaller and tighter communities, emergent decentralized mesh networks, local Wi-Fi networks to warn of dangers in the local environment or damages in the network and celebrate the connections between technology and our natural worlds.'



Courtesy of Superflux

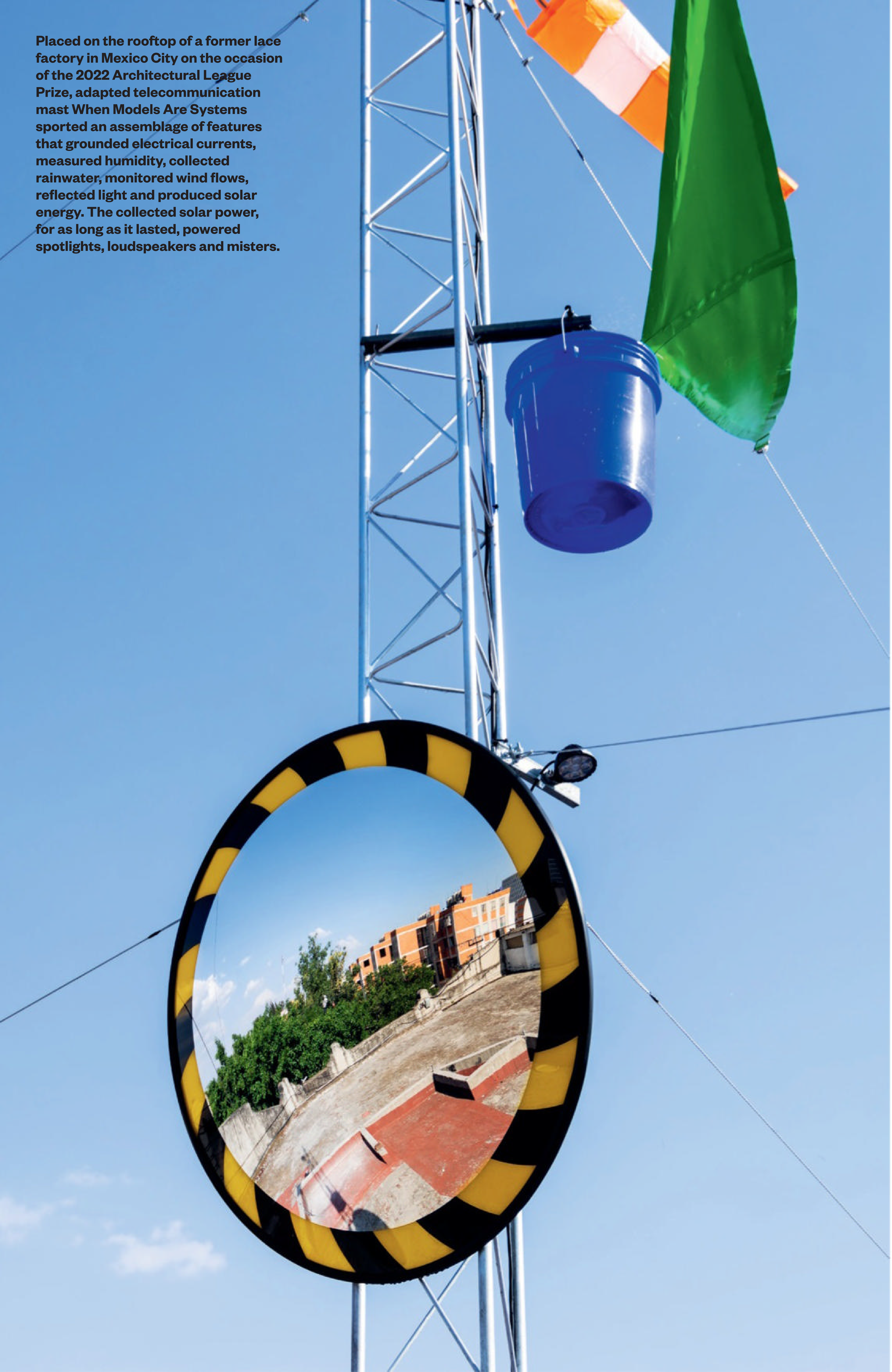
Maris Locmelis

Courtesy of Levi's

ABOVE **A joint effort between Sarmite Polakova and Mara Berzina, the project Pre-Loved turns inferior fibres from post-consumer textile waste into a biocomposite for future garment making. At the 'end' of its life, the leather-like composite can be dissolved and its textile fibres repurposed.**

LEFT **Levi's teamed up with the British Council's Architecture Design Fashion division to explore innovative approaches to circular design. Selected after an open call, Dutch multidisciplinary design agency Envisions and British educational association Store reimagined post-consumer denim through 75 individual experiments, using techniques such as 3D printing, weaving and braiding, and creating new materials such as denim composites, denim fur and denim paint using indigo dye extracted from a pair of jeans.**

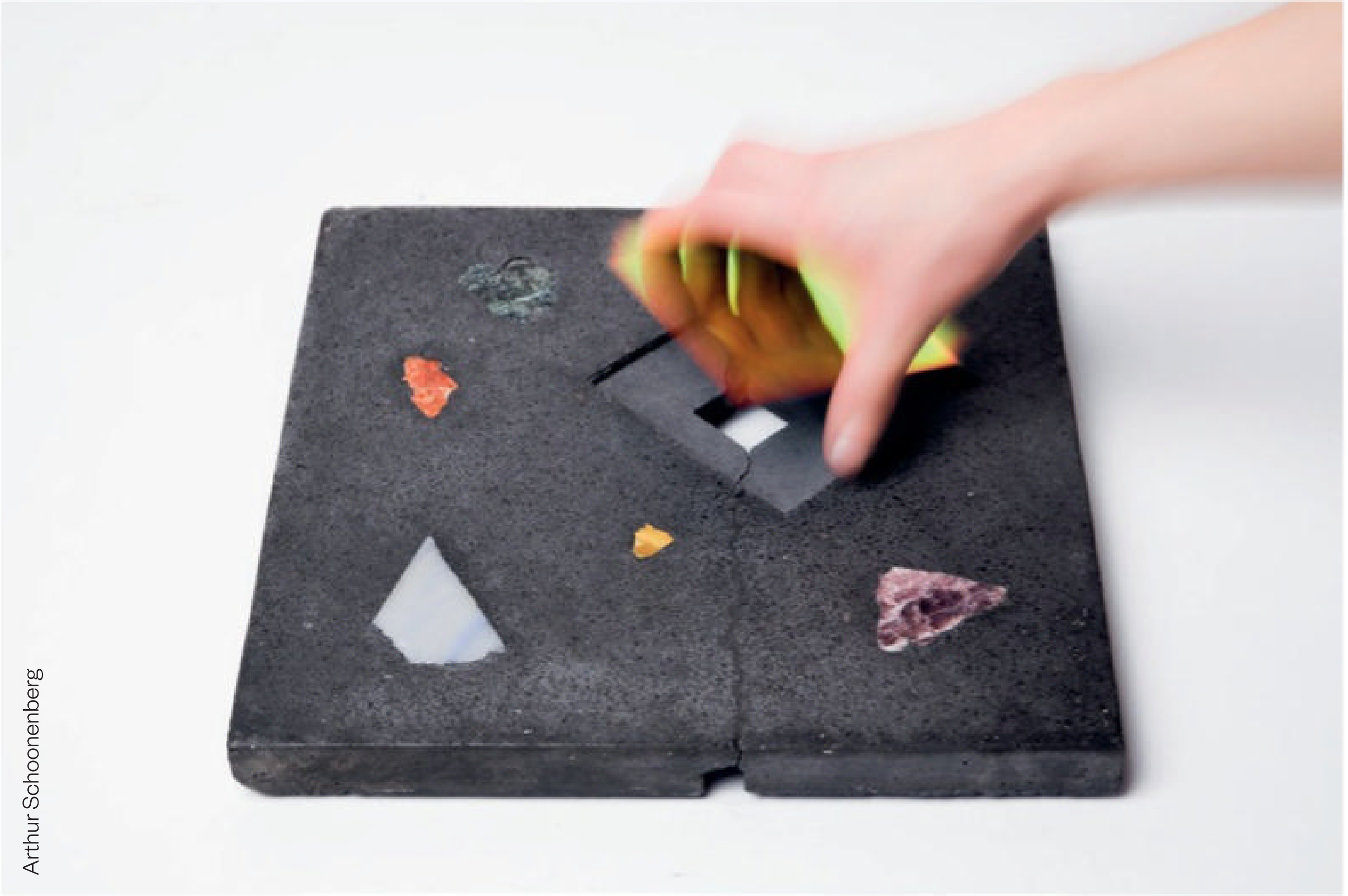
Placed on the rooftop of a former lace factory in Mexico City on the occasion of the 2022 Architectural League Prize, adapted telecommunication mast When Models Are Systems sported an assemblage of features that grounded electrical currents, measured humidity, collected rainwater, monitored wind flows, reflected light and produced solar energy. The collected solar power, for as long as it lasted, powered spotlights, loudspeakers and misters.



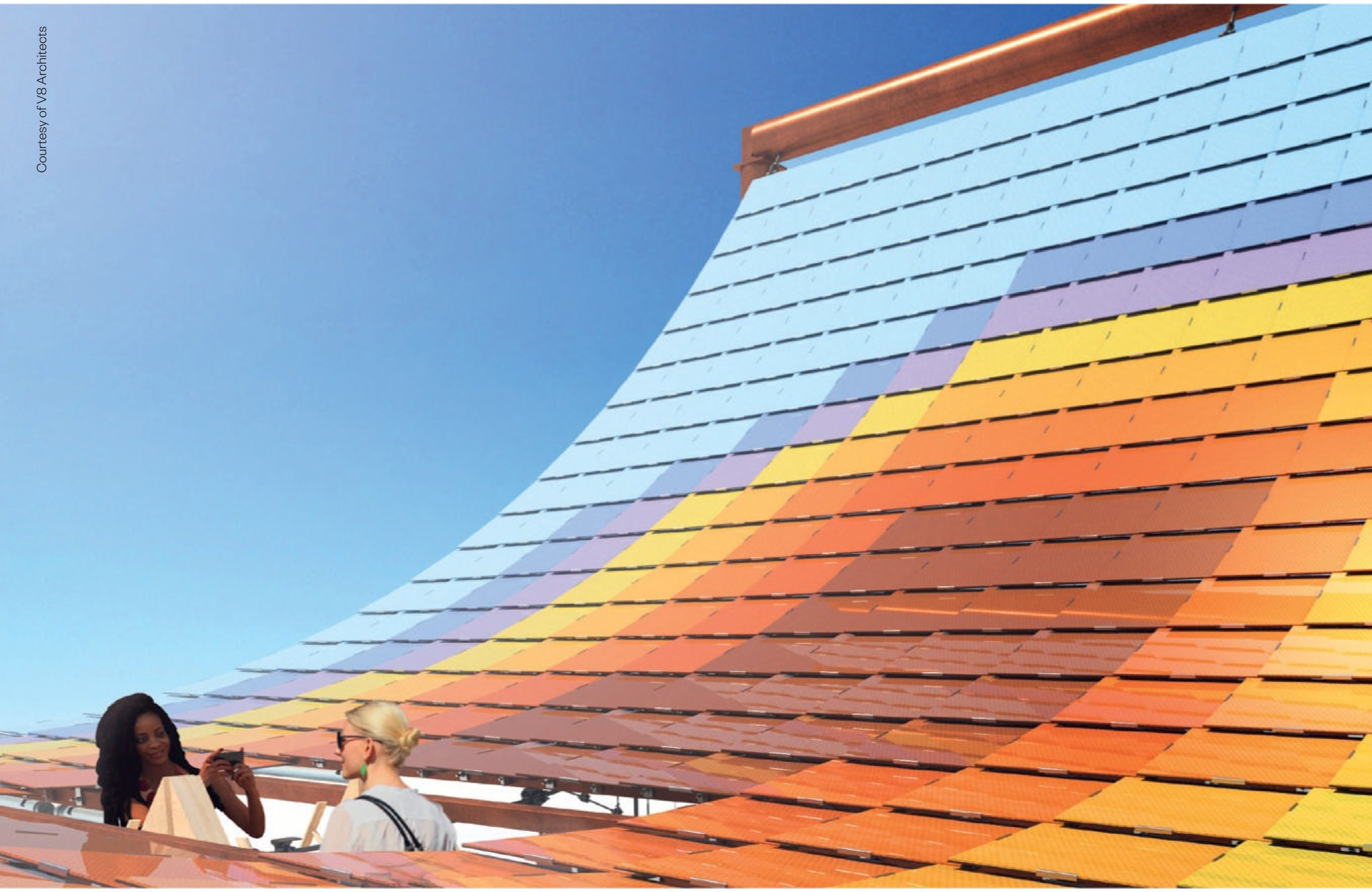
Adriana Hamui

RIGHT **In its search for a new and expressive material vocabulary for concrete, Studio Ossidiana developed a Solar Terrazzo that integrates solar tiles into mineral flooring.**

BELOW **Offering a space for people to gather and learn how harvesting energy from the sun works, the Solar Pavilion by V8 Architects and Marjan van Aubel Studio comprised a set of colourful panels sourced from Kameleon Solar stretched over four steel masts. The materials that went into the fully circular installation – a partnership with the inaugural Solar Biennale, presented in Eindhoven during Dutch Design Week 2022 – were returned to the owners and partners.**



Arthur Schoonenberg

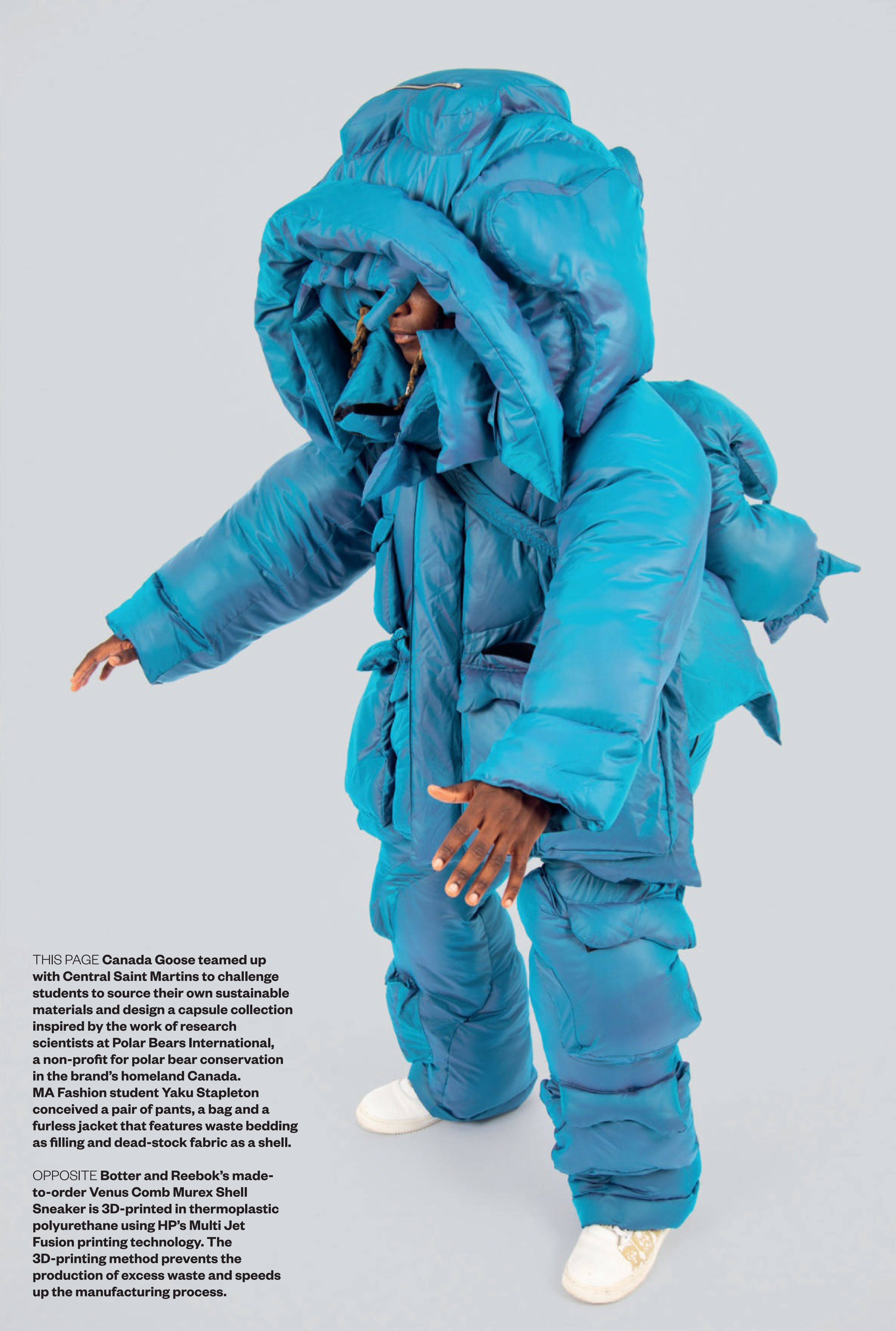


Courtesy of V8 Architects

In the project Carbon Banks, Space10 pairs a physical wooden chair to a digital tree. Permanently bound together via the blockchain, the objects age simultaneously – the longer the chair is kept and cared for, the lusher and more unique the generative digital asset becomes. Providing a digital testament to how we treat our physical furniture, Carbon Banks hopes to incentivize consumers to keep, repair, trade and recycle their furniture. Space10 partnered with Studio Zünc for the visual development and execution.

Zunc Studio

Courtesy of Reebok

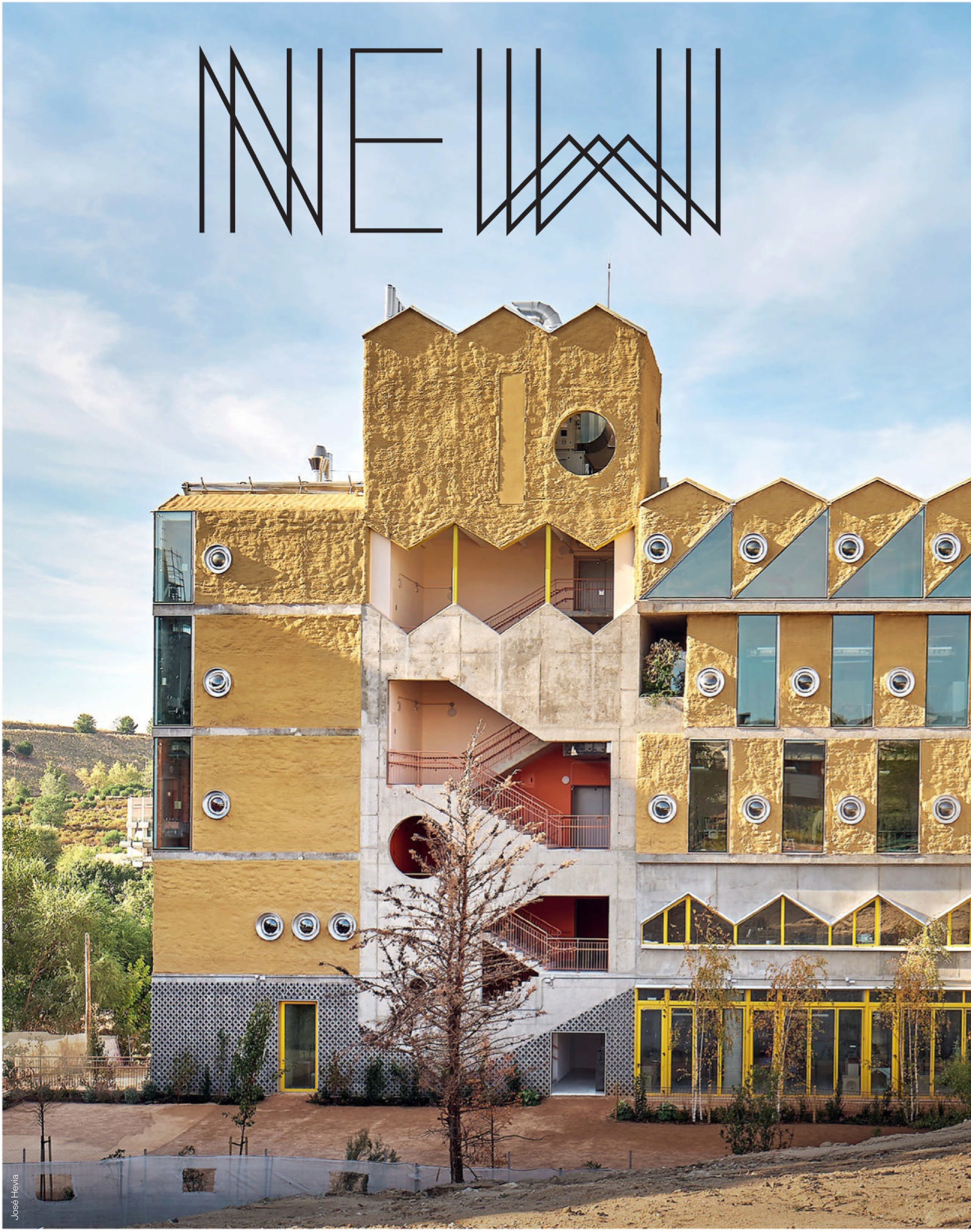


THIS PAGE **Canada Goose teamed up with Central Saint Martins to challenge students to source their own sustainable materials and design a capsule collection inspired by the work of research scientists at Polar Bears International, a non-profit for polar bear conservation in the brand's homeland Canada. MA Fashion student Yaku Stapleton conceived a pair of pants, a bag and a furless jacket that features waste bedding as filling and dead-stock fabric as a shell.**

OPPOSITE **Botter and Reebok's made-to-order Venus Comb Murex Shell Sneaker is 3D-printed in thermoplastic polyurethane using HP's Multi Jet Fusion printing technology. The 3D-printing method prevents the production of excess waste and speeds up the manufacturing process.**

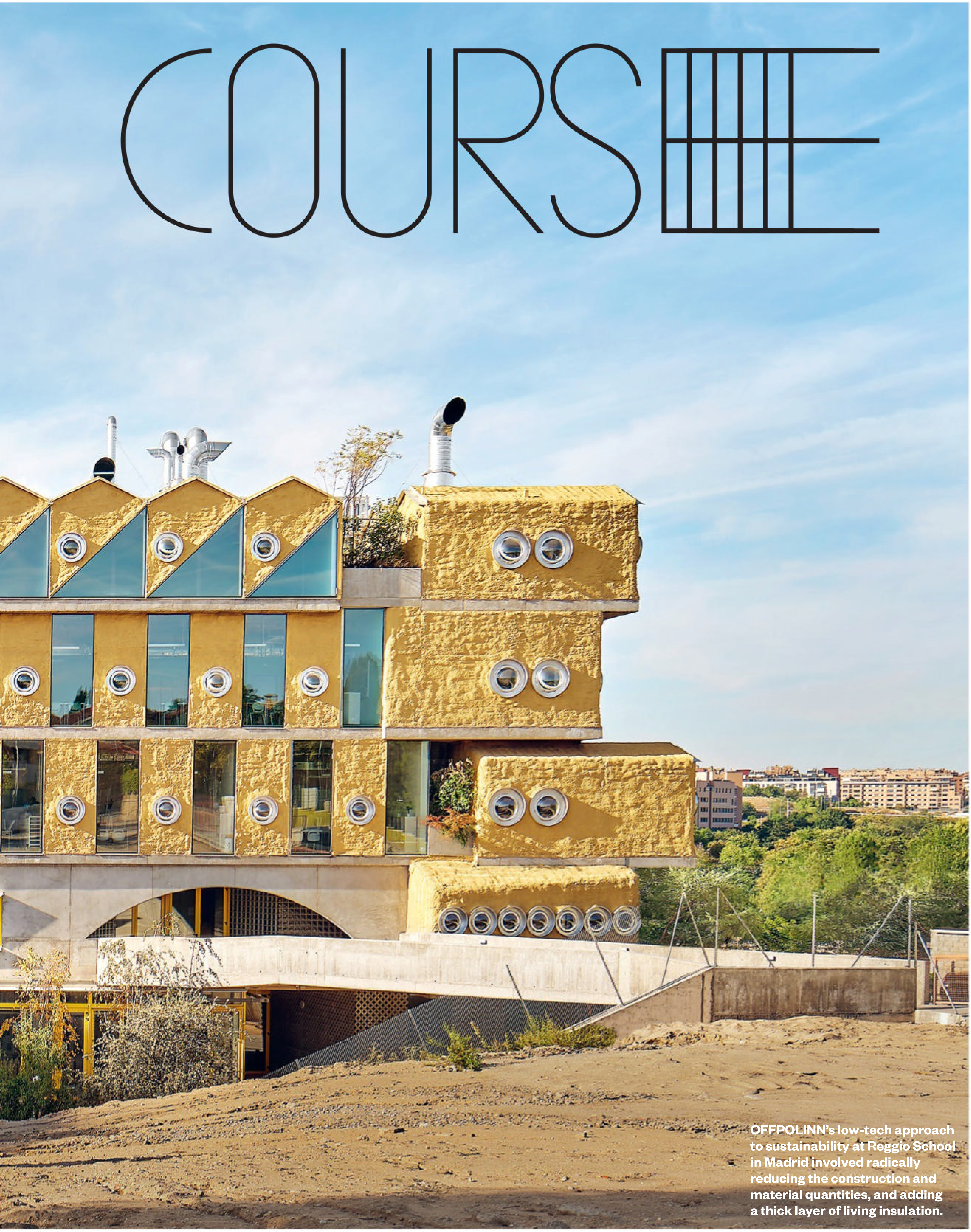
Courtesy of Yaku Stapleton

NEW



José Hevia

COURSE



OFFPOLINN's low-tech approach to sustainability at Reggio School in Madrid involved radically reducing the construction and material quantities, and adding a thick layer of living insulation.

A Madrid school emerges as a benchmark for more sustainable, human-centric design to empower young generations.

Words Lauren Grace Morris

The built environment hugely impacts children's first impressions, shaping their behaviour and communicating values. In form and function, schools are lighthouses for better futures – they raise our growing generations and inspire new ways of being and thinking. As we wrote upon the release of our publication *Where We Learn*: 'The spaces in which we learn are rapidly adapting to become radical yet fluid containers for the production and sharing of knowledge, exactly how and where it is needed the most.'

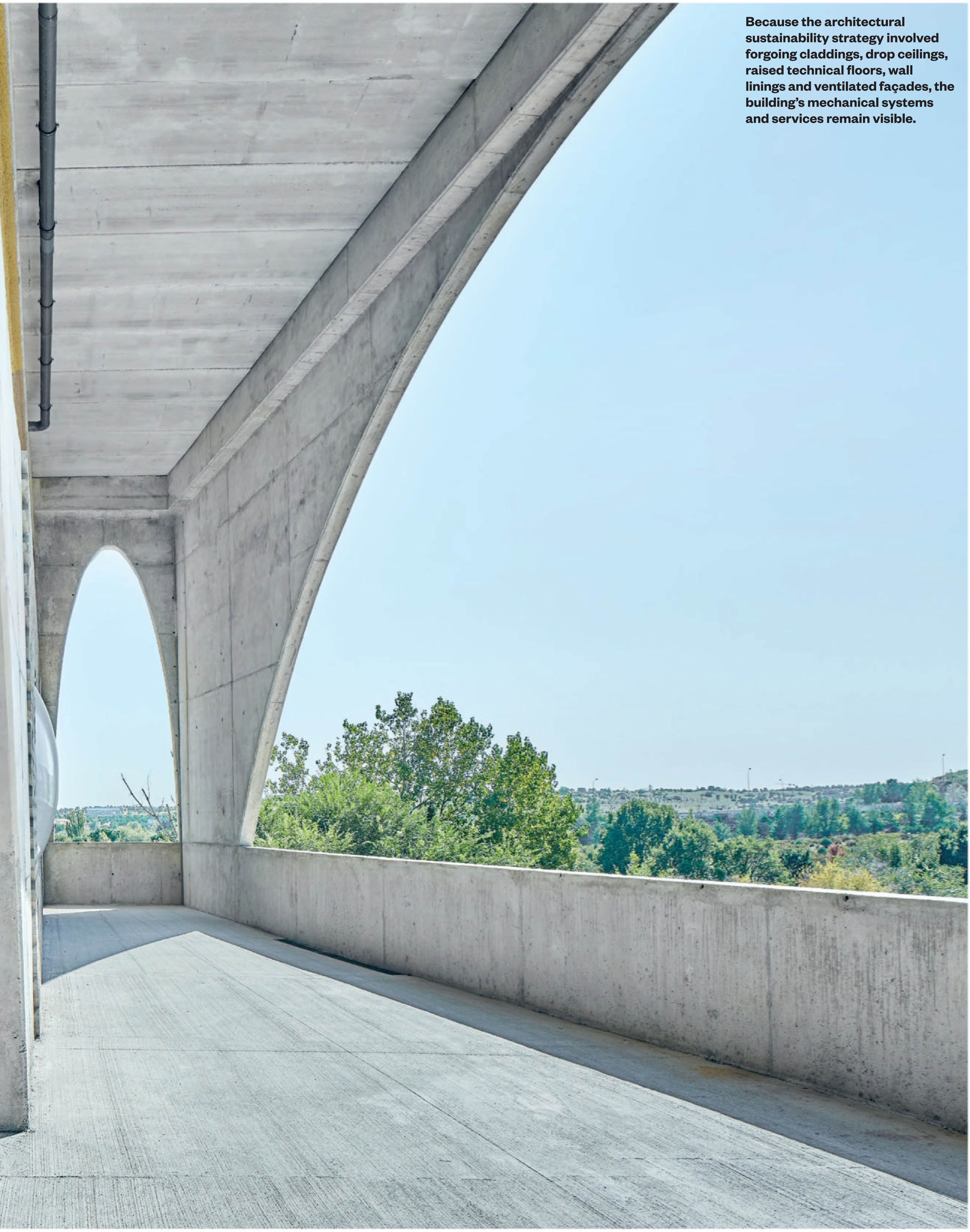
The design of Reggio School in Madrid meets this standard, setting the stage for an institution that *actively* helps young people cultivate their minds and pursue more sustainable, conscious and empathetic behaviour. Andrés Jaque's Office for Political Innovation (OFFPOLINN) worked with the idea of using architecture to inspire exploration and inquiry in children. He describes it as a 'multiverse where the layered complexity of the environment becomes readable and experiential'. Inspired by the pedagogical ideas of late Italian educator Loris Malaguzzi – founder of the Reggio Emilia Approach, a student-centred and constructivist self-guided curriculum – the building merges human-centric, collective-focused design and ecological integration.

Its compact, vertical alignment, which hosts students of different ages on different levels, not only encourages students to navigate autonomously, but also minimizes the construction's footprint. The designers decided to go against the grain – 90 per cent of school designs expand horizontally, they say – to optimize the building's foundations and radically reduce the surface area of its façade.

The ground floor, with classrooms for younger pupils, flows into the surrounding terrain. Higher up, the spaces for intermediate students coexist with reclaimed water and soil tanks, which feed an indoor garden that rises towards a greenhouse structure. The classrooms for the eldest children are organized around this top garden level. Also critical to the learning landscape is the second-storey 'social plaza', a 465-m^2 void with landscape-scale arches as entry points. OFFPOLINN sees this space as a 'summiting chamber', where students and teachers are motivated to participate in school government.

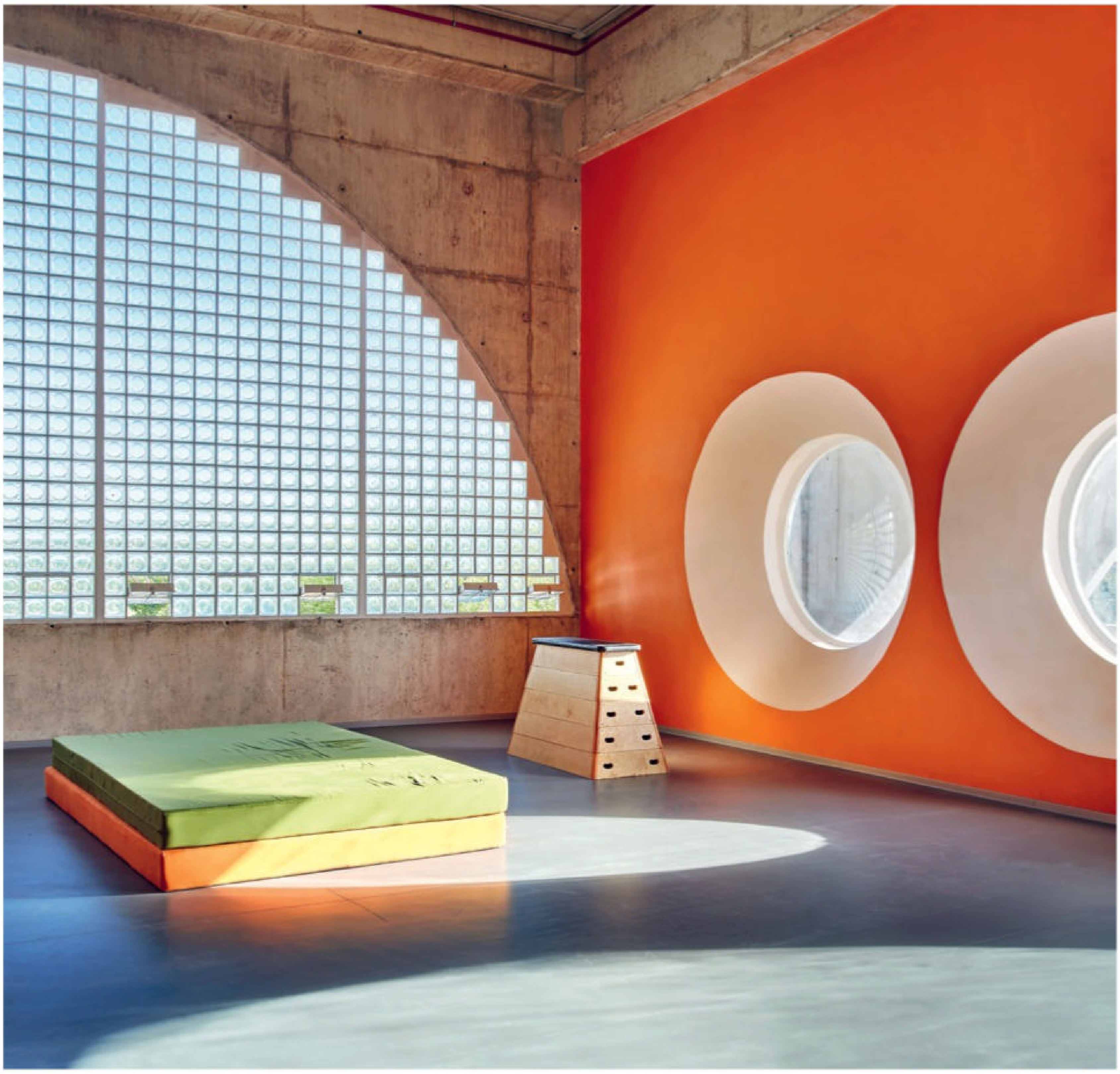
In an era of high-tech sustainable solutions, Reggio School promotes a more affordable route by what the designers call 'thinning, skinning' and making things 'fluffy'. This approach involved radically reducing the construction and material quantities, and adding a thick layer of living insulation. There are no claddings, drop ceilings, raised technical floors, wall linings or ventilated façades, helping to decrease the amount of material used for the façades, roofs and interior partitions by 48 per cent. Mechanical systems and services are thus visible, lending the building a »

Most of the façade is covered with an insulating natural cork mixture developed by the architects for the project, which contributes to the passive reduction of 50 per cent of the energy consumed by heating the school's interiors.



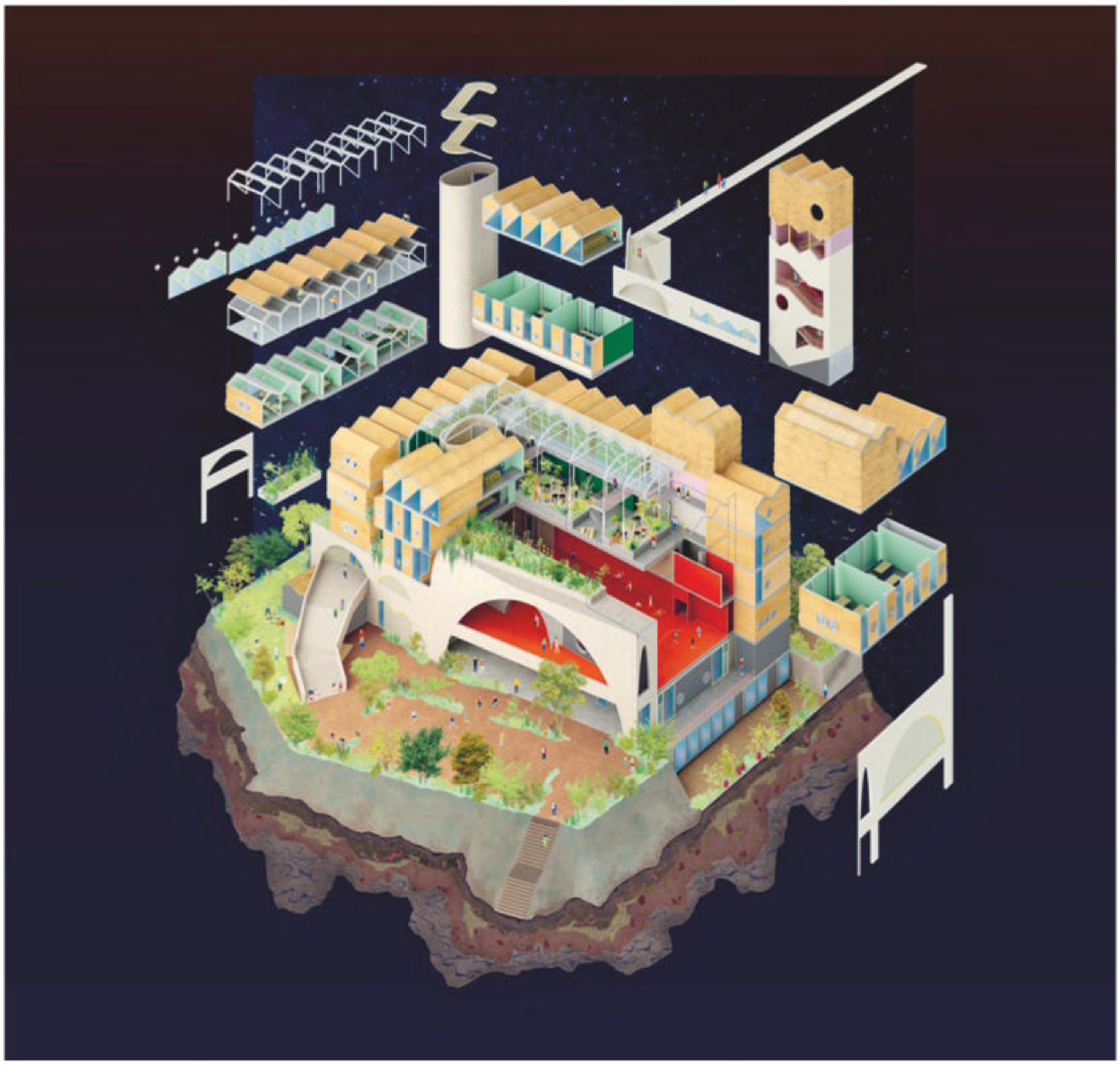
Because the architectural sustainability strategy involved forgoing claddings, drop ceilings, raised technical floors, wall linings and ventilated façades, the building's mechanical systems and services remain visible.

Arched openings and portholes reduce the necessary amount of concrete and steel reinforcement – two materials with high carbon emissions.



OPPOSITE **An enclosed greenhouse space – a living 'lab' for biology students – helps to keep the surrounding classrooms warm in winter and cool in summer.**

RIGHT **The school's verticality optimizes the building's foundations and drastically reduces the surface area of its façade, while encouraging students to navigate autonomously.**



visual 'nakedness' that the designers see as a benefit for the students. 'The flows that keep the building active become an opportunity for students to interrogate how their bodies and social interactions depend on water, energy, and air exchanges and circulations,' says Jaque.

Although forced by economic restraints to use concrete – a material responsible for up to 8 per cent of the world's global CO_2 emissions – the team worked with researcher and structural engineer Iago González Quelle to reduce the thickness of loadbearing walls by an average of more than 150 mm in comparison with conventional reinforced concrete structures. Overall, they achieved a 33 per cent reduction in the embedded energy of the building's structure.

Developed by the architects specifically for the project, a natural cork mixture covers 80 per cent of the exterior and serves as insulation. With twice the thermal properties required by Madrid's regulations, it contributes to the passive reduction of 50 per cent of the energy consumed by heating the school's interiors. Rainwater can run freely down this 14-cm-thick 'living skin', whose crevices will eventually accommodate fungi, vegetal and animal life.

One of the key messages for sustainability is to reduce, reuse and recycle – in that order – a mantra OFFPOLINN has taken to heart. The bubble windows might appear to be a quirky architectural feature, but they're also the result of sifting through warehouses for unsellable stock. As Jaque told *The Guardian*, they were originally manufactured as roof lights for trailers, for which there is now little demand. 'We always adapt the design to what we can find,' he said. 'It's like mining new materials – and celebrating the potential of quotidian things.'●

The ground floor, with classrooms for younger pupils, flows into the surrounding terrain.

REGGIO SCHOOL PROMOTES AFFORDABLE SUSTAINABILITY BY ‘THINNING, SKINNING’ AND MAKING THINGS ‘FLUFFY’

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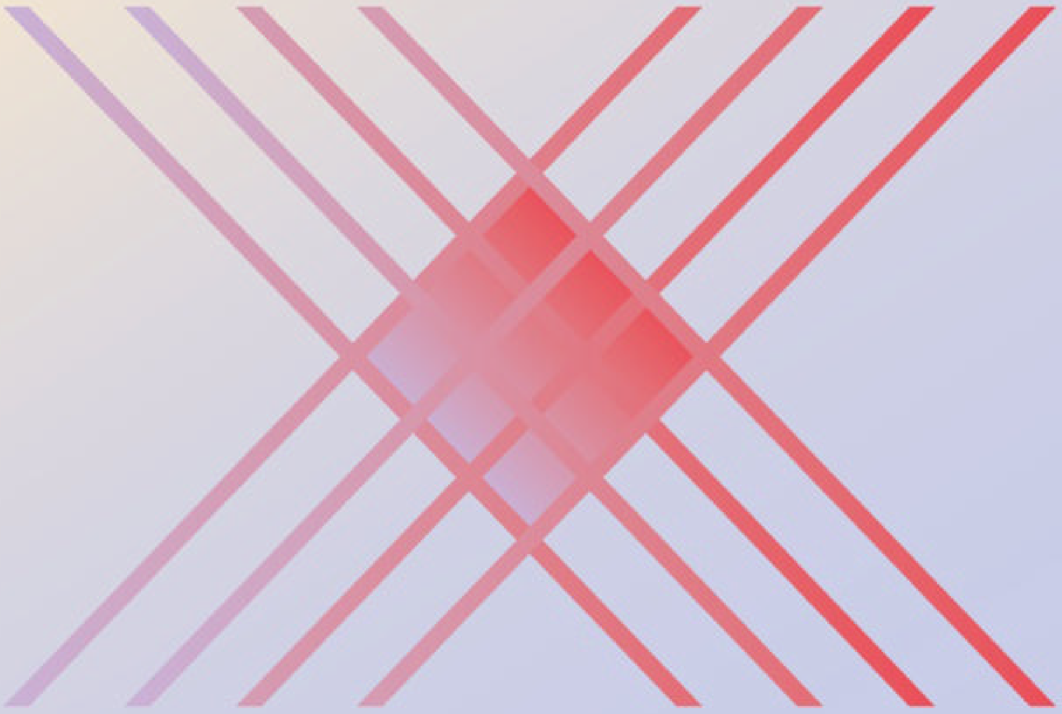
TAKE A



40%

of global greenhouse gas emissions come from buildings. Of these, approximately 70% are produced by building operations, while the remaining 30% are the result of construction.

AVOID BAND-AID SOLUTIONS

Companies are asking designers to dream up inventive ways to reuse their waste, but sustainability should start at the root. Designers can act as creative ecoconsultants, analysing a company’s materials and manufacturing processes to identify areas for improvement. Avoiding band-aid solutions also means ensuring that clients and communities have the skills and resources to sustain the spaces and products realized by designers.

AWAYS

WORK TRANSDISCIPLINARILY

Experienced at mediating between production, industry and the market, designers will play a key role in encouraging the adoption of new materials, but many sustainable solutions will require input from various outside experts. The advancement of biomaterials, for instance, will rely on collaboration between textile designers, microbiologists and molecular biologists.

28 JULY

marked Earth Overshoot Day in 2022, the date when humanity has exhausted all the biological resources that the Earth regenerates during the entire year. That date is expected to arrive even earlier in 2023.

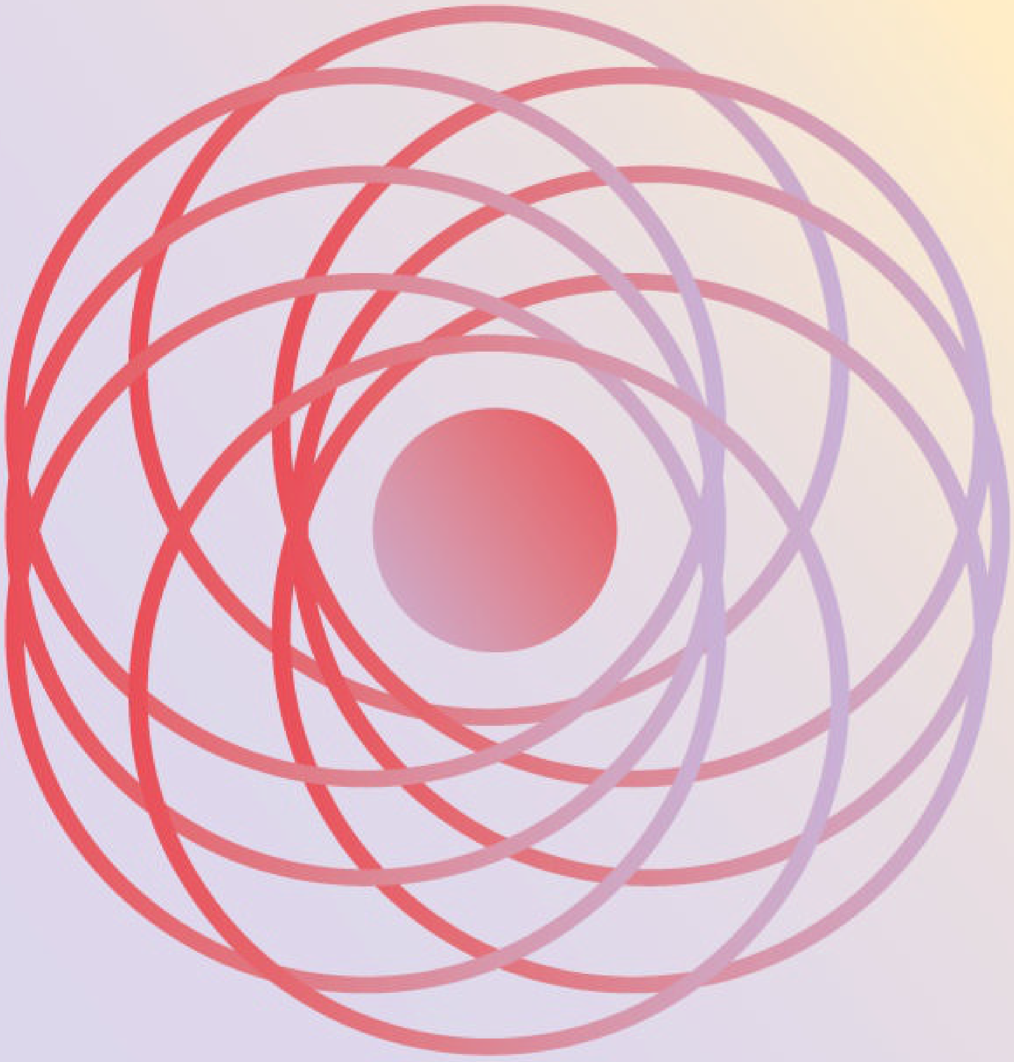
> ***‘Determine what goes into a building and make sure it comes out cleaner’***

Vincent van der Meulen, Kraaijvanger Architects partner and author of *Building with a Positive Footprint*

1100000000

tonnes is the volume of building-material waste Transparency Market Research predicts will be generated each year by 2025, almost doubling since 2012 reports.

> ***‘While a concern for where materials come from and how they are produced sits outside the remit of most practising architects, any meaningful reform of construction practice must start here’***
>
> **Material Cultures team, *Material Reform: Building for a Post-Carbon Future***

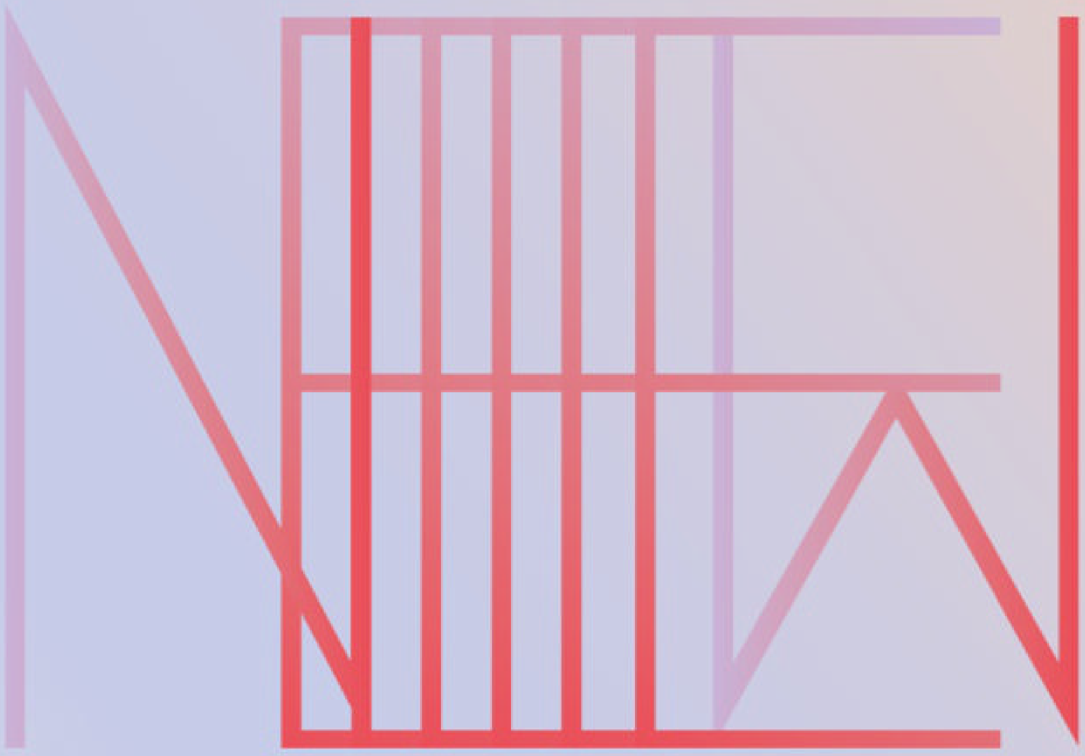


MAKE WASTE WORK CIRCULARLY

Although working with waste may be more sustainable, it’s not necessarily circular. To keep waste materials in the circular chain, employ methods such as designing for disassembly and reuse, and avoid glue, resins and blending materials.

CONSIDER NEW AESTHETICS

There will be compromises on the road to sustainability. Designers and clients will potentially have to abandon or at least amend their favoured material palettes – and even challenge their personal aesthetics. The outward appearance of sustainable products could help to communicate their important message, and even give rise to a new look for luxury.



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of the global building area that exists today will still exist in 2040, reports Architecture 2030. Without widespread existing building decarbonization, these buildings will still be emitting CO_2 in 2040 and we will not achieve the Paris Agreement's 1.5°C target.

2050

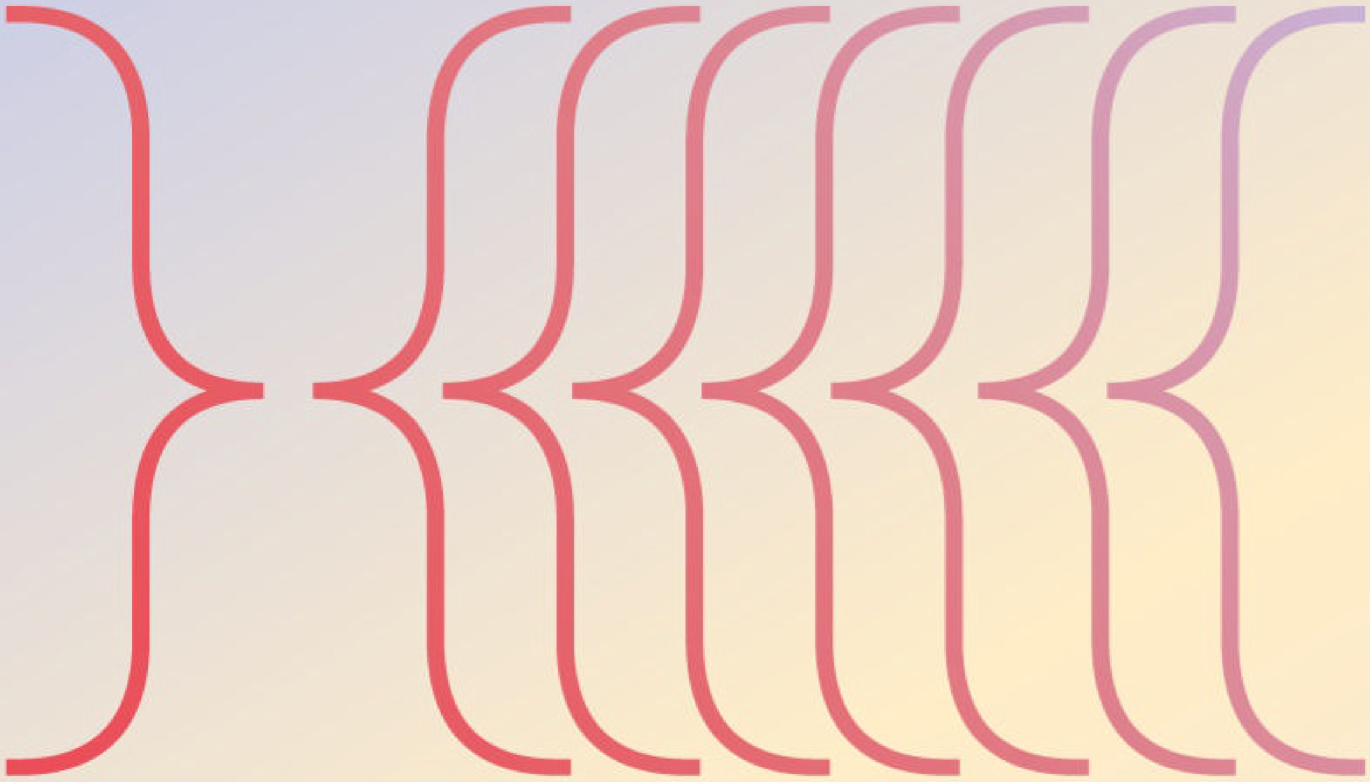
is the deadline given by the Intergovernmental Panel on Climate Change (IPCC) for becoming net zero. To reach this goal, according to the 'Breakthroughs' report of UN campaign Race to Zero, all new buildings need to operate with net-zero emissions while reducing the buildings' embodied emissions by 2030.

17-21%

of global energy-related carbon emissions can be attributed to residential homes, while 11% of global food waste comes directly from households, according to Space10's 'The Regenerative Home' report.

EMBED EDUCATION

From students at schools to guests at hotels to employees in the workplace, the users of spaces can play an active role in sustainability. Including (spaces for) sustainability-oriented programming will be crucial, providing the wider community with knowledge that can be put into practice beyond the building's walls.



> ***'Education has to move away from the myth of only achieving success through innovative new architecture, and instead drive that innovation towards reuse'***

Pedro Gadanho, author of *Climax Change!*

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